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MICHIGAN

SECOND BIENNIAL REPORT

OF THE

STATE HIGHWAY COMMISSIONER

1907 AND 1908



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MEMBERS OF DEPARTMENT.

HORATIO S. EARLE	<i>Commissioner.</i>
FRANK F. ROGERS	<i>Deputy Commissioner.</i>
LETTIE J. BROWN	<i>Chief Clerk.</i>
J. V. GONGWER	<i>Draughtsman.</i>
W. IRENE MCCARTHY	<i>Stenographer.</i>



HORATIO S. EARLE,
State Highway Commissioner.

MICHIGAN
STATE HIGHWAY DEPARTMENT
LANSING.

February 1, 1909.

HON. FRED M. WARNER,
Governor:

Sir:—In conformity with the law I submit to you my second biennial report.

Respectfully,
HORATIO S. EARLE,
State Highway Commissioner.



Nature's art and man's skill combined, making "life worth living" in Marquette county. One of the best roads ever built. Built of trap rock by county road commission.

REPORT AND RECOMMENDATIONS.

The legislature of 1905, by unanimous vote, submitted to the electors of the state the question of adopting an amendment to the constitution, which would allow the state to aid in the improvement of the public wagon roads. The amendment was adopted at the April election, 1905, carrying in every county in the state, the whole majority in favor being 142,242.

The same legislature carried out the people's will by passing Act No. 146, P. A. 1905, creating the state highway department, and appropriating \$30,000 for the fiscal year ending July 1st, 1906, and \$60,000 for the fiscal year ending July 1st, 1907, of which \$20,000 for the first year and \$50,000 for the second year was set aside to be expended in payments to townships and counties of certain specified rewards, to encourage the building of good roads.

The same legislature enacted that all of the license fees received from automobile owners and drivers, less the cost of collection, should also go to the state highway department to be used in the furthering of the good roads cause.

The legislature of 1907 appropriated \$110,000 for the fiscal year ending July 1st, 1908 and \$160,000 for the fiscal year ending July 1st, 1909, of which \$100,000 for 1907 and \$150,000 for 1908 constituted the state reward fund and the balance was to be used for the running expenses of the department.

Since the department was created there has been paid over from the automobile license fund \$20,410.33; all of which makes a grand total of \$370,410.33.

The assessed valuation of the general property of the state for 1905, on which the good roads tax was levied and collected, was \$1,574,422,770, which made the owner of a home worth one thousand dollars, whether in the city, the village or in the country, pay a tax of one cent and nine mills,—less than the price of a box of matches.

In 1906 the assessed valuation of general property was \$1,596,431,914, on which the \$60,000 good roads fund was raised, so taxing the one thousand dollar home-owner the enormous sum of three cents and eight mills,—less than the price of one cigar.

In 1907 the assessed valuation of general property was \$1,654,371,892, on which the \$110,000 good roads tax was spread, so taxing the one thousand dollar home-owner the sum of six and one-half cents, a trifle more than sufficient to pay for one street car ride and a paper to read while riding.

In 1908 the assessed valuation of general property is \$1,648,671,411, on which \$160,000 good roads fund was raised, so taxing the one thousand dollar home-owner about ten cents, or enough to buy a drink of

whisky. I have seen a lot of persons buy a drink who did not complain of the tax on it, and then kick around all day about a little good roads contribution.

No other state in the same length of time has ever made such strides in good road building as has Michigan and of this I am proud. A great deal of the credit is due to the many loyal good roads advocates among all classes throughout the state. The county road institutes held each year have contributed largely to the success of the good roads movement in this state. Bringing the actual road builders in conference with themselves and with a representative of the state highway department naturally distributes to all the good ideas of each one, and by comparing notes, new ideas are brought to light.

Twenty-six counties in the state have adopted the county road system and about thirty more will vote on the question of its adoption at the April election, 1909. It is safe to predict that more than twenty of them will adopt the plan, which will place forty counties under this system in 1910, thus doubling, at least, the amount of good road building. Under the authority given me by the provisions of the motor vehicle act I have employed a number of citizens to secure the necessary signatures to insure the submission of the question of adopting the county road system to a vote of the people in over thirty counties. I have done this because I know from the work done in the counties now under that plan that all those adopting it will be greatly benefited thereby.

If all the counties of the state come under the county road system it will undoubtedly require an appropriation by the state of \$500,000 a year to pay the state reward that would be applied for. If Los Angeles county, California, can afford to bond for \$3,500,000 to build good roads in that one county; if the state of New York can afford to bond for fifty millions to build good roads in that state, and if little Connecticut can afford to appropriate a million of dollars each year for state aid for roads, it seems to me that prosperous Michigan can afford an appropriation of a half million dollars each year to encourage the building of improved highways.

Two years ago I advised in my report the repealing of the statute labor law, and this was done by the legislature of 1907. It would have been miraculous had the new law given perfect satisfaction in every township in the state the first year. I certainly did not expect it would, but what has been done in the way of improving roads under the cash road tax law has more than satisfied me. In townships where incompetent commissioners were elected and in townships where its provisions have not been properly carried out, it has not given satisfaction, but the law is not to blame for that. Neither is the law satisfactory to those who, for years, had gotten off without doing their road work or commuting it at a small percentage of the tax levied. Protests will undoubtedly be handed in against the cash tax system, but I urge the legislature to scan closely these protests and the correspondence in connection with them and see if they are not generally biased. You will find them signed by men who are against public improvements, automobile haters and so forth. I have taken steps to prove to the legislature that the law on the whole has given satisfaction to thousands of representative farmers and business men, and I shall hand to the roads and bridges

committee this tremendous endorsement. I urge all senators and representatives to thoroughly investigate the matter before taking a step backward. New York state followed us and repealed their statute labor law in the last legislature.

RECOMMENDATIONS.

I recommend that the legislature of 1909 make sufficient appropriation for the running expenses of the state highway department so that three field engineers may be employed, one for the upper peninsula and two in the lower peninsula, also that a bridge engineer be employed, for I believe the tax payers of the state of Michigan do not desire to have the commissioner and the employes of the department work nights and Sundays all the year around as they have had to do a large part of the time since the department was created.

I recommend that the county road law be amended to provide that if a township in any county operating under the county road system shall build state reward roads with money raised by bonding, then the amount of the county road tax paid by such township each year shall be returned to the township treasurer to be applied on the payment of the bonds until such time as said bonds are fully paid. Also that county road commissioners in counties under the county road system upon request by the township board of any township in the county shall expend any moneys set aside by the township for the purpose of building good roads, and that such moneys shall be expended when and where, and the roads shall be built from such material and in such manner as such township board may direct.

I recommend amending the cash road tax law so as to give the township highway commissioner the right to expend for road repair at least twenty dollars per mile for the number of miles of road in the township, whether this amount of road repair tax has been voted at the April meeting or not, and that it shall be the duty of the commissioner to keep an accurate account of such expenditure, and report the same to the supervisor on or before October 1st, and it shall then be the duty of the supervisor to levy this road repair tax upon all the taxable property in the township, outside of incorporated villages.

I recommend the passage of a law prohibiting the hauling over state reward roads of a heavier load than one ton to each inch in width of wagon tire. I recommend the passage of a wide tire law, providing that after a certain date no wagons shall be sold which do not have reasonably wide tires.

I recommend the amendment of the law relative to noxious weeds, to make every overseer of highways a weed commissioner. Further to make it the duty of every owner of property abutting on any public highway to keep all noxious weeds and brush cut alongside his property to the center of the road. If he fail to do this when officially notified by the weed commissioner, then it shall be the duty of the weed commissioner to cut such weeds and to report the cost of such cutting to the supervisor of the township. It shall then be the duty of the supervisor to levy a tax upon the property equal to the cost of such cutting, plus an additional ten per cent, to be collected in the same manner as other taxes are collected. The additional ten per cent shall be-

come a part of the general fund, to be used in the cutting of weeds on property owned by the township or set aside for school purposes. The present law regarding noxious weeds should also be amended to provide that notices of the cutting of such weeds be posted in three public places in the township and published in a newspaper printed and circulating in the county of which such township is a part, for three weeks prior to the date fixed upon when such weeds shall be cut. This will save hundreds of dollars worth of time and labor in the preparing of notices under the present plan.

I recommend that the legislature place Michigan in a position to follow the plan in operation in other states, of employing convicts to quarry and crush stone for roads, this stone to be sold to townships and counties at actual cost of production and transportation; finding the average cost and charging to all the same price whether delivered a short distance or a long one.

The automobile license fund pays for the printing and distributing of these reports. Some newspaper critics have charged me with wasting the people's money by sending copies of my reports to the papers, so no more copies will be sent excepting by request of the editor or owner, but if any of them desire a copy we shall be glad to furnish same when asked to do so.

December 18, 1908.

Hon. Fred M. Warner,
Governor of Michigan,
Lansing, Michigan:

Sir:—In obedience to your request of the 12th inst., I submit to you the synopsis of my biennial report covering the period from July 1st, 1905, to December 1st, 1908.

Applications for state reward for gravel and macadam roads have been made to the amount of 562.348 miles. Of this amount 3.129 miles have been rejected, owing to the fact that they did not comply with the requirements of the law. There have been cancelled, for various reasons, applications to the amount of 42.528 miles. There have been built and accepted and orders issued for payment of rewards thereon 301.348 miles made up as follows: 7.142 miles of combination road, 140.940 miles of gravel road, 153.266 miles of macadam road.

The total amount of reward applied for has been \$408,643. Of this \$2,379 was refused on account of rejected applications. Cancelled applications total \$28,263. There has been paid \$228,215, and \$149,786 is still pending.

There has been appropriated for carrying on the work of this department \$360,000. Of this amount \$40,000 was allowed for current expenses of the office and \$320,000 for state reward. So it appears that there is a shortage of funds to pay rewards applied for, which may become due, of \$58,001, but it is altogether likely that at least fifty miles of road, upon which applications have been entered, will either not be built or will go over to another year. Figuring one-half of this to be gravel and the rest macadam, the reward on same would be \$37,500, which deducted from the apparent shortage of \$58,001 leaves an apparent net shortage of \$20,501. However, there is not and will not be any shortage for two reasons:

First, the law does not permit of any, as payment of reward depends entirely on sufficient money having been appropriated and if not enough has been raised, then no indebtedness is incurred by the state, owing to such building. When the next appropriation is made, the townships and counties which have built roads meriting reward, will receive the first payments from the money appropriated.

Second, there is enough money on hand to pay all rewards that will become due on roads finished prior to the end of this fiscal year, June 30th, 1909.

My books closed November 30th and this report is made up to and including that date, but since December 1st inspections have been made and twenty-five miles more accepted, making a grand total of three hundred twenty-six miles of road built since the creation of this department.

Twenty-six counties are under the county road system and the building of good roads is greatly enhanced by this plan. Over thirty counties

in the state will vote on the adoption of this system on the first Monday in April next, and it is safe to predict that at least twenty counties will adopt it. So it is planned that a great deal more good road will be built in 1910 than has been built in Michigan in any one year before.

The funds for carrying on this county road campaign have been taken from the automobile license fees.

For your encouragement, and in satisfaction to my own pride in this cause, for which I have labored in season and out of season since 1895, I beg to call your attention to the ratio of increase in road building in the four years that state reward has been constitutionally and legally made possible. In 1905 approximately twenty miles were built; in 1906, forty miles; in 1907, eighty miles and 1908, one hundred sixty miles. If it were possible to keep up this pace for eight years more, we would be able to make every mile of road in the state a good one. Should this same ratio be maintained for the next two years, it would mean that applications for state reward on 960 miles of road will be received. Allowing that one-half be gravel and one-half stone, it would mean that, should the state satisfy the demand, it would be necessary to appropriate for state reward \$240,000 for the fiscal year, beginning July 1st, 1909, and \$480,000 for the fiscal year beginning July 1st, 1910, making a total of \$720,000 for the two years. Should we do this, we would even then, the second year, be appropriating less than one-half what the little state of Connecticut appropriates each year for state aid in road building. However, I am not going to recommend an appropriation anywhere near that sum, but instead would recommend curtailing the appropriation somewhat below the demand.

I beg to assert with all the power I can command that the work which every employe in my department has been obliged to perform for the past two years has been by far more than the meanest individual or corporation would ask of employes. It has been necessary to work day and night, and Sundays as well as week days, and even by all our power and time, excepting that actually necessary for eating and sleeping, we have been unable to do the work in as thorough a manner as the welfare of the state demands. I asked two years ago for five thousand dollars more for the running expenses of the department so that I might employ more help. This request the legislature refused to grant and the department has thereby been crippled and unable to do nearly the amount of work that should have been done. I am certain that no body of men can longer deny the benefits to be derived from the work of the department or can fail to realize the increase in the amount to be done, and so I hope it may please you to recommend to the legislature that they will grant the conservative request I herein make. My recommendations are:

An appropriation of \$215,000 for the fiscal year beginning July 1st, 1909, and \$320,000 for the fiscal year beginning July 1st, 1910, of which \$15,000 for the first year and \$20,000 for the second year shall constitute the running expenses of the department.

I further beg to acquaint you with the fact that the furthering of the good roads movement and the cost of text books furnished the commissioners has been paid from the automobile license fund. The

proceeds of these licenses, which has been credited to the department has amounted to \$20,410.33.

I have in my possession two very interesting indorsements.

First, a vote taken in nearly one hundred Granges in the state as to whether they favor employing a portion of the convicts at quarrying and crushing stone and selling it at actual cost of production and transportation to townships and counties for roads. Two thousand one hundred sixty-two votes were cast of which four hundred forty-seven voted "No" and one thousand seven hundred fifteen voted "Yes."

Second, I have the signatures of six thousand representative farmers and business men, who have signed statements that they believe the township highway commissioners have done more and better work under the cash tax law than could have been done under the old statute labor system, and that they favor a continuance of the same.

Both of these documents I will turn over to the proper committees in the incoming legislature.

I should like to ask you and the members of the legislature to note in my report, when it appears, the salaries paid by other states to their state highway commissioners and state engineers. I suggest that you add these together and divide the sum by the number of states and that you recommend paying the state highway commissioner the amount obtained thereby so that he may be rated at least an average man from an average state.

Your obedient servant,

HORATIO S. EARLE,
State Highway Commissioner.



Nature's art and man's skill combined, making "life worth living" in Marquette county. One of the best roads ever built. Built of trap rock by county road commission.

REPORT AND RECOMMENDATIONS.

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take and subscribe the oath of office prescribed by the constitution, and shall file the same in the office of the secretary of state, and the said commissioner shall give to the people of the state of Michigan, a bond in the penal sum of five thousand dollars, with sureties to be approved by the auditor general, conditioned for the faithful discharge of the duties of his office. The commissioner shall make a biennial report to the governor, which report shall contain the names and compensation of each and every person that may be or has been employed by the department and the whole amount of expenses by the department during the interim not previously reported. Such report shall be made on or before the first day of February, nineteen hundred seven, and every two years thereafter, and the commissioner shall have printed a sufficient number of these reports to provide every township highway commissioner, county highway commissioner and superintendent or commissioner of streets in the state with one, and enough more to satisfy the demand that the public weal may warrant.

SEC. 3. The highway commissioners of the several townships in each and every county in the state, and the county highway commissioners in counties working under the county road law, shall meet annually in a road institute, at such time and place in each county as the state highway commissioner may designate, there to consider such matters as he may present to their attention, and to discuss such matters of road improvement as may be of special interest to such township and county highway commissioners, and every township highway commissioner may collect from his township the same per diem for this day as for one spent in actual road work, and his actual expenses in attending such institute shall, if reasonable, be allowed by the township board and shall be paid by said township. Every county highway commissioner may collect from his county the same per diem for this day as for one spent in actual road work, and his actual expenses in attending such institute shall, if reasonable, be allowed by the board or committee or county auditors who may have the authority in such matters in the county of which he is a county highway commissioner, and shall be paid by said county.

SEC. 4. At the request of the state highway commissioner, every road district overseer of highways, every township overseer of highways, every township highway commissioner, every county highway commissioner, and every village or city superintendent or commissioner of streets, shall make a sworn report to the state highway commissioner, on or before December first each year, answering such questions as the state highway commissioner shall deem proper to ask and they able to answer, giving him such information as he may require and their ability permit, appertaining to roads, streets, methods of construction, material, machinery and costs upon blanks which he may furnish and send out.

SEC. 5. Any road district overseer of highways, or township overseer of highways, or township highway commissioner, or county highway commissioner, or village or city superintendent or commissioner of streets, who shall refuse or neglect to make such report at time stated or within thirty days thereafter, when requested to by the state highway commissioner, or who shall, in whole or in part, refuse or neglect to make such report at time stated or within thirty days thereafter, or

who shall make a report which shall be in whole or in part false, shall be guilty of a misdemeanor, and upon conviction thereof, in any court of competent jurisdiction, be fined in any sum of not less than ten dollars and costs, and not exceeding one hundred dollars and costs, or be confined in jail not less than ten days, nor more than thirty days for each and every offense at the discretion of the court. Violations of the provisions of this act may be prosecuted in the name of the people of the state of Michigan, and it shall be the duty of the prosecuting attorney of each county to prosecute for any violation of the provisions contained in sections four and five of this act.

SEC. 6. It shall be the duty of the state highway commissioner to furnish outline plans and specifications for the improvement of public wagon roads, and, when requested to, and where proposed improvements are of sufficient importance to warrant, he shall go or send some one, to give expert advice of how to best build or improve public roads or bridges. He shall also gather all the information possible about all kinds of road building material in the state, its relative value, cost, and also cost of transportation to other places in the state, and to give this information upon request to any road or street official in the state free of charge to them.

SEC. 7. The terms, roads or public roads or public wagon roads in this act, shall, at all times be construed to mean the leading public wagon roads outside of incorporated villages and cities.

SEC. 8. The state highway commissioner shall keep a complete record of the doings of the state highway department, which record shall be the property of the state, and shall as soon as possible make a map of every township in the state showing the roads and the conditions of the roads, together with marks indicating where road building material can be found, and what kind and what quality.

SEC. 9. Whenever any township shall file notice with the state highway department through its township board, or when any county commissioners in counties under the county road law, shall do likewise, that the township (or townships acting conjointly on boundary line roads) or county (or counties acting conjointly on boundary line roads) has made arrangements to improve a mile or more of public wagon road by building a clay gravel, a gravel, a stone-gravel, a gravel-stone, or macadam road, and shall ask for an allotment of state reward, and shall file with the department a profile of the road to be improved, made out by a competent surveyor, and shall make application for outline plans and general specifications, it shall be the duty of the state highway commissioner to enter such application in the order in which it is received, and to furnish the outline plans and general specifications asked for, and provided there are any funds in the state treasury not yet allotted, appropriated for state reward for roads, he shall make the allotment, and providing the fund appropriated for state reward shall have all been allotted, then the allotment shall be made as soon as there shall be available funds in the state treasury. When any township (or townships acting conjointly on boundary line roads) or any county (or counties acting conjointly on boundary line roads) has built a mile or more of such road as is hereinafter described, and when inspected by the state highway commissioner, or by some one acting under authority of the

commissioner, is found to be up to the required standard, he shall, providing there are funds in the state treasury for the paying of this reward, verify the same to the auditor general of the state, who shall draw a warrant upon the state treasurer, payable to the proper authorities in such township or county, or townships or counties, for the amount of reward due them, for the amount and class of road built. And providing there are no funds in the state treasury for the paying of such reward, as soon as sufficient moneys shall become available, the state highway commissioner shall verify the same to the auditor general, who shall draw his warrant as above set forth: Providing, That the road shall be kept in as good condition as when approved by the commissioner, until the payment of the reward thereon.

SEC. 10. The following described roads, when built, shall merit the reward attached to each description:

(a) For every mile of well graded road on which the steepest incline shall not exceed six per cent and the width of which shall not be less than eighteen feet between side ditches, and which shall be properly drained, and have a wagon way or travel track not less than nine feet wide made in two courses; the bottom course to be of an approved mixture of clay and sand not less than five inches thick after rolling, and covered with a layer of gravel which shall not be less than five inches thick after rolling: Provided, That both shoulders and metaled track shall be properly crowned so as to shed water quickly to the side ditches, shall merit, if approved by the state highway commissioner, a reward from the state of two hundred fifty dollars a mile and pro rata for extra miles and fractions thereof in excess of the first mile.

(b) For every mile of well graded road on which the steepest incline shall not exceed six per cent, and the width of which shall not be less than eighteen feet between side ditches, and which shall be properly drained, and have a wagon way or travel track not less than nine feet wide, and which shall consist of not less than eight inches of compacted gravel, which must be applied in not less than two layers, each layer to be rolled separately: Provided, That both shoulders and metaled track shall be properly crowned so as to shed water quickly to the side ditches, shall merit, if approved by the state highway commissioner, a reward from the state of five hundred dollars a mile and pro rata for extra miles and fractions thereof in excess of the first mile.

(c) For every mile of well graded road on which the steepest incline shall not exceed six per cent, and the width of which shall not be less than eighteen feet between side ditches, and which shall be properly drained and have a wagon way or travel track not less than nine feet wide made in two courses; the bottom course to be of crushed stone, which shall not be less than four inches thick after thorough rolling; and a top course consisting of a layer of gravel which shall not be less than three inches thick after being thoroughly rolled: Provided, That both shoulders and metaled track shall be properly crowned so as to shed water quickly to the side ditches, shall merit, if approved by the state highway commissioner a reward from the state of seven hundred fifty

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take and subscribe the oath of office prescribed by the constitution, and shall file the same in the office of the secretary of state, and the said commissioner shall give to the people of the state of Michigan, a bond in the penal sum of five thousand dollars, with sureties to be approved by the auditor general, conditioned for the faithful discharge of the duties of his office. The commissioner shall make a biennial report to the governor, which report shall contain the names and compensation of each and every person that may be or has been employed by the department and the whole amount of expenses by the department during the interim not previously reported. Such report shall be made on or before the first day of February, nineteen hundred seven, and every two years thereafter, and the commissioner shall have printed a sufficient number of these reports to provide every township highway commissioner, county highway commissioner and superintendent or commissioner of streets in the state with one, and enough more to satisfy the demand that the public weal may warrant.

SEC. 3. The highway commissioners of the several townships in each and every county in the state, and the county highway commissioners in counties working under the county road law, shall meet annually in a road institute, at such time and place in each county as the state highway commissioner may designate, there to consider such matters as he may present to their attention, and to discuss such matters of road improvement as may be of special interest to such township and county highway commissioners, and every township highway commissioner may collect from his township the same per diem for this day as for one spent in actual road work, and his actual expenses in attending such institute shall, if reasonable, be allowed by the township board and shall be paid by said township. Every county highway commissioner may collect from his county the same per diem for this day as for one spent in actual road work, and his actual expenses in attending such institute shall, if reasonable, be allowed by the board or committee or county auditors who may have the authority in such matters in the county of which he is a county highway commissioner, and shall be paid by said county.

SEC. 4. At the request of the state highway commissioner, every road district overseer of highways, every township overseer of highways, every township highway commissioner, every county highway commissioner, and every village or city superintendent or commissioner of streets, shall make a sworn report to the state highway commissioner, on or before December first each year, answering such questions as the state highway commissioner shall deem proper to ask and they able to answer, giving him such information as he may require and their ability permit, appertaining to roads, streets, methods of construction, material, machinery and costs upon blanks which he may furnish and send out.

SEC. 5. Any road district overseer of highways, or township overseer of highways, or township highway commissioner, or county highway commissioner, or village or city superintendent or commissioner of streets, who shall refuse or neglect to make such report at time stated or within thirty days thereafter, when requested to by the state highway commissioner, or who shall, in whole or in part, refuse or neglect to make such report at time stated or within thirty days thereafter, or

who shall make a report which shall be in whole or in part false, shall be guilty of a misdemeanor, and upon conviction thereof, in any court of competent jurisdiction, be fined in any sum of not less than ten dollars and costs, and not exceeding one hundred dollars and costs, or be confined in jail not less than ten days, nor more than thirty days for each and every offense at the discretion of the court. Violations of the provisions of this act may be prosecuted in the name of the people of the state of Michigan, and it shall be the duty of the prosecuting attorney of each county to prosecute for any violation of the provisions contained in sections four and five of this act.

SEC. 6. It shall be the duty of the state highway commissioner to furnish outline plans and specifications for the improvement of public wagon roads, and, when requested to, and where proposed improvements are of sufficient importance to warrant, he shall go or send some one, to give expert advice of how to best build or improve public roads or bridges. He shall also gather all the information possible about all kinds of road building material in the state, its relative value, cost, and also cost of transportation to other places in the state, and to give this information upon request to any road or street official in the state free of charge to them.

SEC. 7. The terms, roads or public roads or public wagon roads in this act, shall, at all times be construed to mean the leading public wagon roads outside of incorporated villages and cities.

SEC. 8. The state highway commissioner shall keep a complete record of the doings of the state highway department, which record shall be the property of the state, and shall as soon as possible make a map of every township in the state showing the roads and the conditions of the roads, together with marks indicating where road building material can be found, and what kind and what quality.

SEC. 9. Whenever any township shall file notice with the state highway department through its township board, or when any county commissioners in counties under the county road law, shall do likewise, that the township (or townships acting conjointly on boundary line roads) or county (or counties acting conjointly on boundary line roads) has made arrangements to improve a mile or more of public wagon road by building a clay gravel, a gravel, a stone-gravel, a gravel-stone, or macadam road, and shall ask for an allotment of state reward, and shall file with the department a profile of the road to be improved, made out by a competent surveyor, and shall make application for outline plans and general specifications, it shall be the duty of the state highway commissioner to enter such application in the order in which it is received, and to furnish the outline plans and general specifications asked for, and provided there are any funds in the state treasury not yet allotted, appropriated for state reward for roads, he shall make the allotment, and providing the fund appropriated for state reward shall have all been allotted, then the allotment shall be made as soon as there shall be available funds in the state treasury. When any township (or townships acting conjointly on boundary line roads) or any county (or counties acting conjointly on boundary line roads) has built a mile or more of such road as is hereinafter described, and when inspected by the state highway commissioner, or by some one acting under authority of the

commissioner, is found to be up to the required standard, he shall, providing there are funds in the state treasury for the paying of this reward, verify the same to the auditor general of the state, who shall draw a warrant upon the state treasurer, payable to the proper authorities in such township or county, or townships or counties, for the amount of reward due them, for the amount and class of road built. And providing there are no funds in the state treasury for the paying of such reward, as soon as sufficient moneys shall become available, the state highway commissioner shall verify the same to the auditor general, who shall draw his warrant as above set forth: Providing, That the road shall be kept in as good condition as when approved by the commissioner, until the payment of the reward thereon.

Sec. 10. The following described roads, when built, shall merit the reward attached to each description:

(a) For every mile of well graded road on which the steepest incline shall not exceed six per cent and the width of which shall not be less than eighteen feet between side ditches, and which shall be properly drained, and have a wagon way or travel track not less than nine feet wide made in two courses; the bottom course to be of an approved mixture of clay and sand not less than five inches thick after rolling, and covered with a layer of gravel which shall not be less than five inches thick after rolling: Provided, That both shoulders and metaled track shall be properly crowned so as to shed water quickly to the side ditches, shall merit, if approved by the state highway commissioner, a reward from the state of two hundred fifty dollars a mile and pro rata for extra miles and fractions thereof in excess of the first mile.

(b) For every mile of well graded road on which the steepest incline shall not exceed six per cent, and the width of which shall not be less than eighteen feet between side ditches, and which shall be properly drained, and have a wagon way or travel track not less than nine feet wide, and which shall consist of not less than eight inches of compacted gravel, which must be applied in not less than two layers, each layer to be rolled separately: Provided, That both shoulders and metaled track shall be properly crowned so as to shed water quickly to the side ditches, shall merit, if approved by the state highway commissioner, a reward from the state of five hundred dollars a mile and pro rata for extra miles and fractions thereof in excess of the first mile.

(c) For every mile of well graded road on which the steepest incline shall not exceed six per cent, and the width of which shall not be less than eighteen feet between side ditches, and which shall be properly drained and have a wagon way or travel track not less than nine feet wide made in two courses; the bottom course to be of crushed stone, which shall not be less than four inches thick after thorough rolling; and a top course consisting of a layer of gravel which shall not be less than three inches thick after being thoroughly rolled: Provided, That both shoulders and metaled track shall be properly crowned so as to shed water quickly to the side ditches, shall merit, if approved by the state highway commissioner a reward from the state of seven hundred fifty

dollars a mile and pro rata for extra miles and fractions thereof in excess of the first mile.

(d) For every mile of well graded road on which the steepest incline shall not exceed six per cent, and the width of which shall not be less than eighteen feet between side ditches, and which shall be properly drained, and have a wagon way or travel track not less than nine feet wide made in two courses; the bottom course to be of gravel and not be less than four inches thick after thorough rolling; and a top course consisting of a layer of crushed stone, which shall not be less than three inches thick after being thoroughly rolled and properly bonded with sufficient stone screenings: Provided, That both shoulders and metaled track shall be properly crowned so as to shed water quickly to the side ditches, shall merit, if approved by the state highway commissioner, a reward from the state of seven hundred fifty dollars a mile and pro rata for extra miles and fractions thereof in excess of the first mile.

(e) For every mile of well graded road on which the steepest incline shall not exceed six per cent, and the width of which shall not be less than eighteen feet between side ditches, and which shall be properly drained, and have a wagon way or travel track not less than nine feet wide of well compacted macadam not less than six inches thick, laid in not less than two courses, each to be properly bonded with sufficient stone screenings and thoroughly rolled: Provided, That both shoulders and metaled track shall be properly crowned so as to shed water quickly to the side ditches, shall merit, if approved by the state highway commissioner, a reward from the state of one thousand dollars a mile and pro rata for extra miles and fractions thereof in excess of the first mile.

SEC. 11. No claim for state reward for improved roads of over two miles in any one township in any one fiscal year shall be allowed by the state highway commissioner: Provided, however, If any township or county shall have raised money by tax or by sale of bonds to build a mile or more of road such as merits state reward, and the road shall be built and approved by the state highway commissioner, and this road is kept in as good condition as when approved by the commissioner, such township or county shall have its application number remain upon the books of the department and draw from the state reward fund each year, until such time as the township or county has received the amount due for the class and amount of road built: Provided, Money has been appropriated for state reward. In case the road building money was raised by the sale of bonds, the state reward money shall be used only for the payment of the principal of the bonds.

SEC. 12. The state highway commissioner is hereby given the authority to refuse to grant any further road reward to any township or county that has been rewarded by the state for improving roads, that does not keep these state rewarded roads in proper repair, but, upon his refusal to any township or county for an allotment of state reward, it shall be the commissioner's duty to inform such township or county of what repairs are necessary to place them in a position to again be eligible to receive state reward, and if these repairs are made satisfactorily to the commissioner, he shall reinstate them to the eligible reward list.

SEC. 13. The decision of the state highway commissioner shall be final, relative to whether the road is built well enough or not to merit state reward, and shall have the right to retain any amount of the reward he deems advisable until the road has been thoroughly tested.

SEC. 14. This act gives no authority to pay any reward for any improvements made in public wagon roads prior to the passage of this act.

SEC. 15. There shall be assigned to the state highway commissioner, by the board of state auditors, suitable rooms at Lansing for the conducting of the business of the state highway department, and they shall provide suitable furniture and office equipment.

SEC. 16. To carry out the provisions of this act, there is hereby appropriated for the fiscal year ending June thirty, nineteen hundred eight the sum of one hundred ten thousand dollars and for the fiscal year ending June thirty, nineteen hundred nine the sum of one hundred sixty thousand dollars; of which ten thousand dollars each year constitutes the sum to be used for the running expenses of the department, and the balance constitutes the state reward fund, for encouraging the improvement of the public wagon roads. Any moneys remaining in either or both of these funds at the close of any fiscal year, shall, by the auditor general be carried over and added to the funds which become available for the year following.

SEC. 17. The auditor general shall add to and incorporate in the state tax for the year nineteen hundred seven the sum of one hundred ten thousand dollars, and for the year nineteen hundred eight the sum of one hundred sixty thousand dollars, which when collected shall be credited to the general fund to reimburse the same for the money hereby appropriated.

Given immediate effect.

DIGEST.

Provides for payment of \$250 per mile for clay-gravel, \$500 for gravel, \$750 for stone-gravel or gravel-stone, and \$1,000 for stone roads, if built according to plans and specifications of state highway department.

Profile and application for state reward must be filed before road is built.

Not to exceed two miles of state reward road can be paid for in a township in a year. If more is built, reward will be paid the next year, providing, of course, that money has been appropriated to pay state reward for that year.

\$100,000 has been appropriated to pay state reward for the fiscal year ending June 30, 1908, and \$150,000 for the year ending June 30, 1909.

State highway department to furnish all information possible in regard to improving any highway, also to furnish information regarding bridges.

Township and county highway commissioners required to attend road institute each year. Their expenses and per diem paid for so doing.

County, township and city road and street commissioners required to make report when requested by state highway department.

HOW TO APPLY FOR STATE REWARD.

Write the state highway department for application blanks, which will be sent at once. One application blank for each separate piece of road to be improved, is to be filled out and signed by the township board, or board of county road commissioners and returned to the state highway department.

SAMPLE APPLICATION.

State Highway Commissioner, Lansing, Michigan.

Sir—At a meeting of the township board of the township of *Elkland*, county of *Tuscola*, held this *1st* day of *July*, 1905, the following resolution was adopted:

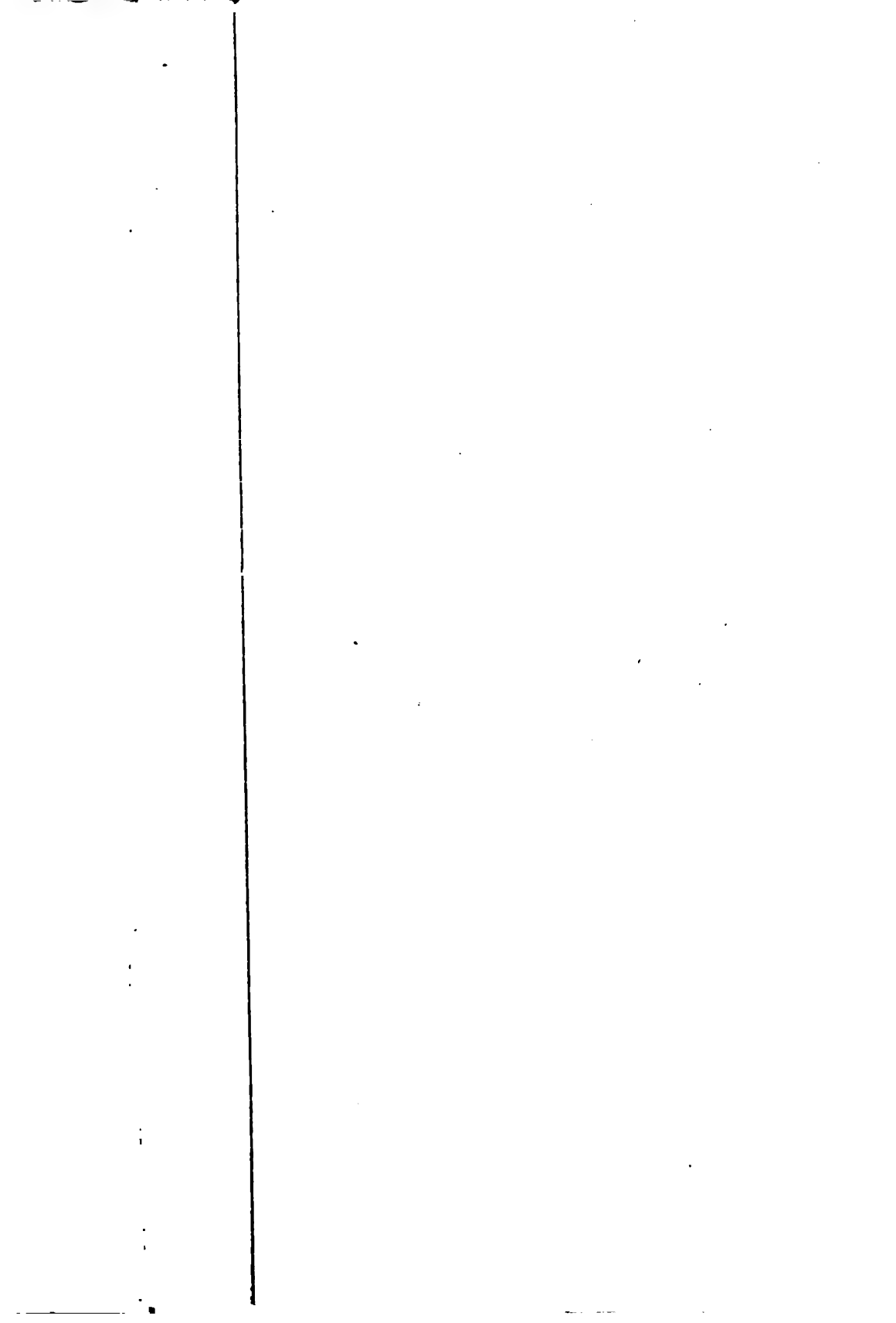
“Resolved, That in accordance with Act No. 146 of the Public Acts of 1905, the township of *Elkland* build *one* mile of road as specified in Class *B* under section ten of said act; that application be made for state reward in the sum of *five hundred* dollars for aid in the construction thereof; that the improvements on said road shall commence at the southwest corner of section 26 and run east between sections 26 and 35 to the southwest corner of section 26, T. 14 N., R. 11 E., the same being a leading public wagon road; that a profile of the present road and plan of the proposed changes be made by a competent surveyor; that copies of this resolution and of the profile and plan be forwarded to the state highway commissioner at Lansing; and that he be requested if same are satisfactory to furnish outline plans and general specifications required in the construction of said road.”

We hereby certify that no part or parcel of the portion of road covered by this application lies within the incorporated limits of any city or village, and that no state reward has heretofore been paid upon any part of said portion of road.

A. A. MCKENZIE, *Supervisor*,
H. F. LENZNER, *Clerk*,
A. D. GILLIES, *Justice of Peace*,
R. S. BROWN, *Justice of Peace*,
P. A. KOEPFGEN, *Highway Commissioner*,
Township Board of *Elkland*.

Dated *July 1st*, 1905, at *Cass City*, Michigan.

With the application send a profile of the road, made out by a competent surveyor or engineer, showing the grade line of the center of the road as it is at the time of applying for state reward, and as it will be when the road has been completed.



SAMPLE PROFILE.

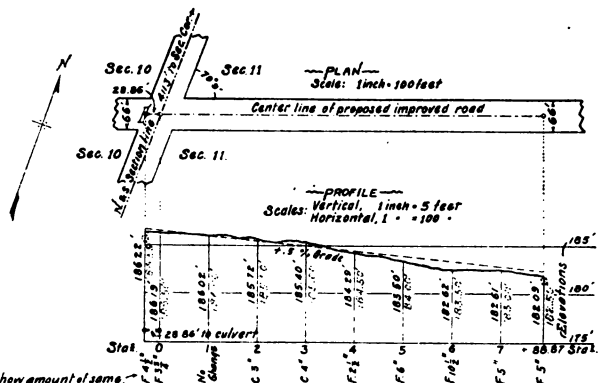
—MAP—
Showing Location and Profile
of that part of the State Road to be improved
in Section 11, T. 16 N. R. 15 E.
JURON COUNTY
MICHIGAN

—Description—
Beginning at a culvert located 28 86 ft.
S. 75° 5' W. from Sta. 0, Sta. 0 being a
point on the Section Line between Sections
10 & 11 distant 4113 ft. from the S.W. Cor.
common to Sections 10, 11, 2 & 3; and running
from said place of beginning N. 75° E. 877.15 ft.
Geo. A. Cushman,
Surveyor & Engineer.

—Note—
On the PROFILE, black lines and figures
represent present surface of the road;
red (dotted) lines and figures represent
the proposed grade.
Points where grade changes are marked X.

Direction for Grading:

"G" indicates a cut, "F" fill, and figures show amount of same.



Upon receipt of the application and profile, the state highway department will furnish plans and specifications for the class and kind of road to be built, and when completed an inspection will be made and, if the road is found to be up to the required standard, the amount of reward merited will be paid. If the department can be of assistance during the process of construction, write or telephone or telegraph and you will be given all the help possible.

No reward can be paid to any township or county which has not filed with the state highway department application and profile of the road before building.

The details shown on above sample profile are all that is required by the department, but on the folded sheet following will be found a standard profile that gives more detail and is consequently more desirable.

GENERAL SPECIFICATIONS.

For a road in town-
 ship county, Michigan, beginning at.....
 and extending to
 a distance of miles.
 to be feet wide and
 (Gravel or macadam)
 inches deep. Total width of road grade..... feet.

The contractor shall furnish all materials, tools, machinery and labor necessary for a proper grading of the roadway, side ditches, shoulders, also for laying and spreading and rolling the material and finishing the roadway complete in every respect as required by these specifications and ready for immediate use. Contractor will be permitted to deliver materials to the road by steam power, provided he uses machinery that is not injurious to the roadway.

The work shall be performed in a manner to conform to these specifications and plans, consisting of profiles, cross-sections and general plan of the work, copies of which are on file with, which plans and these specifications shall form a part of the contract.

On all drawings figured dimensions are to govern in case of discrepancy in scale and figures.

Contractors will be required to submit with their bids samples of the material they propose to furnish, and all material used in the contract will be required to be equal in quality to the samples furnished.

Bidders must name prices on the following items:

(1) Grading per linear foot of road, which shall include preparing the roadbed and shoulders, trimming the ditches and rolling the sub-grade and making the road ready to receive the first course.

(2) in two courses as above specified, including all the sprinkling and rolling and leaving the road ready for travel.
 (Gravel or macadam)

(3) A lump price on the completed road according to plans and specifications.

(1) Linear feet of grading

(2) Linear feet of road
 (Gravel or macadam)

Bids must be made on blanks furnished by and must be accompanied by a certified check in the sum of payable to conditioned that if the contract shall be awarded to the bidder, he will, when required by, execute an agreement in writing to perform the work according to the specifications therefor, accompanied by good and sufficient bonds guaranteeing a faithful performance of the work in accordance with the terms of the contract, and the payment of all bills incurred for labor and materials on account of this contract.

The contractor shall maintain sufficient guards by day and night to

prevent accidents from travel, and will be liable for any damage which may arise from his neglect to do so, or from any omission on his part or on the part of his agents.

He is to commence and prosecute the work on the road at such points as he may be directed to by within ten days from and after signing the contract, and shall prosecute the work rapidly and continuously unless delayed by orders from.....

.....
He further agrees to complete the same on or before the day of 19.... dollars for each day that the work shall remain uncompleted after the time allowed by the contract may be deducted as liquidated damages that..... will suffer by reason of such default, and not by way of penalty; and is hereby authorized to deduct said sum of dollars per day from the moneys which may be due or become due said contractor for work under these specifications. Provided, however that may extend the time limit for the completion of this contract upon the recommendation of the engineer in charge, giving satisfactory reasons for such extension.

The contractor will be required to preserve all stakes and monuments established on the line of the work until duly authorized by the engineer to remove the same. If any monuments or stakes marking the boundaries of property along the line of work have to be removed in the process of grading, the contractor shall promptly notify the engineer in charge so that he can properly locate and reset the same after the grading is complete.

The contractor must preserve the roadway on which he is working from needless obstruction, and where necessary he must construct safe and passable crossings and maintain them in good order. He shall afford all proper and reasonable means for the accommodation of the public and leave the roadway complete in every respect and ready for immediate use. He shall have the right, however, to close that part of the road on which he is working to travel whenever other roads can be traveled without serious inconvenience to the public.

At no time during the progress of the work shall the subgrade be completed more than one thousand feet in advance of the first course, nor shall the first course be completed more than one thousand feet in advance of the finished roadway.

..... reserves the right to build or rebuild or repair any culverts which may be necessary during the construction of this road, and should the contractor be delayed on account of the building, rebuilding or repairing of such culverts he shall be entitled to an extension of his contract equal to the time so delayed.

(If the contractor is to build the culverts, this section should be cut out.)

In case the contractor fails to furnish materials or execute the work in accordance with the plans and specifications, or fails to proceed with the same as rapidly as shall deem necessary in order to complete the same within the time limit, then and in either such case, upon ten days written notice to said contractor, the said shall have the right to

annul and determine such contract and enter upon and take possession of the work and complete the same either by reletting or directly under the charge of said and if the cost of completing the work in such manner shall exceed what it would have cost under the contract, such increased cost shall be paid from any money on hand for work done under this contract, and if that be not sufficient then by the contractor and the sureties on his bond given to guarantee the faithful performance of this contract.

The contractor shall not assign nor sublet this contract nor any portion of it without the consent of

Payments shall be made on this contract for work done and materials furnished in place as the work progresses, said payments to be made every upon estimates of the party in charge, which must be submitted to for approval. per cent of each estimate will be reserved by until the work is fully completed and accepted by said at which time the full amount to be paid for such contract shall become due and payable to the contractor.

Here attach the specifications of the State Highway Department for the kind and class of road to be built.

BID.

For THE ROAD
(Macadamizing or graveling)

IN ACCORDANCE WITH THE SPECIFICATIONS HERETO ATTACHED.

To.....

GENTLEMEN—The undersigned hereby declares that he has carefully examined the enclosed specifications and the drawings therein referred to, and fully understands the same, and hereby offers to provide all the necessary machinery, tools, apparatus and other means of construction and do all of the work and furnish all of the materials called for by said specifications, in the manner prescribed in said specifications, and in accordance with the directions of the engineer in charge of the work for the following prices:

(1) Grading per linear foot, including preparation of the road bed, rolling, forming the shoulders and improving the ditches and gutters as per specifications \$. dollars.

(2)per square yard complete in two courses
(Macadam or gravel)
as per specifications, including rolling and sprinkling \$. dollars

(3) Price (in lump) for completed road as per plans and specifications \$. dollars.

Accompanying this proposal is a certified check for the sum of \$.....dollars, payable to the order of which check is to be forfeited as liquidated damages, if, in case this bid is accepted, the undersigned shall fail to execute a contract with said under the conditions of this proposal, within ten days from the time of its acceptance.

Signed.....

Postoffice Address.....

.....

CONTRACT.

THIS AGREEMENT Made this.....day of.....
....., A. D., by and between
..... of
(Township board, county board or other parties)
.....Michigan, part.... of the first part and
..... of
(Contractor or contractors)
county of, State of.....
part....of the second part.

WITNESSETH, That said part....of the second part, for and in consideration of the sum of money hereinafter specified, hereby agrees to build a.....road in strict conformity with the specifications hereto attached and made a part of this agreement.

IN CONSIDERATION WHEREOF, Said part....of the first part hereby agrees to pay to said part....of the second part, the sum of \$.....dollars as set forth and provided for in the annexed specifications.

IN WITNESS WHEREOF, The parties hereto, have affixed their hands and seals this.....day of.....
A. D.....

_____	{	_____
_____		_____
_____		_____
_____		_____
_____	{	_____
_____		_____

STATE SPECIFICATIONS FOR ROADS.

CLASS "A"

CLAY-GRAVEL ROAD.

Roads of Class "A" are suitable only for sandy soils, having good natural drainage, and where the ground water is several feet below the surface.

Grading:

The roadway shall be graded so as to strictly conform to the plans and specifications for the particular road to be built, which plans and specifications have been submitted to and approved by the state highway commissioner. The finished road shall be not less than eighteen feet between side ditches and have a cross-section oval in form, with an average rise of one inch to the foot from the edge of the side ditch to the center line of the road. The greatest width recommended is twenty-four feet between side ditches with a cross-section similar in form to that described for an eighteen-foot roadway.

Drainage:

The side ditches shall have true grades and sufficient incline to furnish a free and uniform flow of water to the nearest natural outlets, which outlets must be so improved where necessary, as to carry the water quickly away from the highway. Tile drains shall be laid where needed.

Metal bed and shoulders:

After the road has been graded as above described, the metal bed shall be formed in the central part of the road grade as follows: Shoulders of suitable material shall be formed not less than nine feet apart, or such greater distance as may be required to retain the width of metal specified. The shoulders shall extend to the side ditches at the same grade and curvature as required for the finished road. The shoulders may be formed by moving earth from the center of the present road grade to the sides, or by crowning the present road grade by scraping earth from the sides toward the center, or if sufficient suitable material cannot be had along the roadway, it may be brought from other places along the line of work. The metal bed thus formed shall be sufficiently crowned to produce a roadway with the required crown when completed.

Clay and sand course:

After shaping the metal bed in the manner above described a good quality of clay shall be spread upon the road to a uniform depth of three inches. The clay must then be rolled sufficiently to crush the lumps, if there be any, and then harrowed until thoroughly pulverized. Three inches of sand, which may be scraped from the sides with the scraping grader, shall next be spread upon the clay and carefully leveled. The road shall be harrowed until the sand is uniformly mixed with the clay, when it shall be rolled until thoroughly compacted and hard.

Gravel top:

After the rolling above specified the clay and sand course shall be

covered with a layer of gravel of such thickness as to make a uniform depth of five inches after compacting. The gravel must be clean bank gravel, sixty per cent of which shall be pebbles that will be retained on a screen of one-eighth inch mesh and will pass through a screen of one and one-half inch mesh, and forty per cent shall be binding material in the form of coarse sand, clay, clay and iron, or pulverized limestone. This course of gravel shall be sprinkled and rolled until no further compacting is possible. Any hollows that may develop during the process of rolling shall be filled with the same kind of gravel and the rolling continued until the surface is uniformly smooth and hard and everywhere conforms to the proposed grade and cross section of the road.

Manner of rolling:

Rolling shall at all times begin at the sides and, rolling lengthwise of the road, proceed towards the center. The final rolling shall cover all of the space between side ditches, the shoulders being smoothed where necessary with a scraping grader, so that the whole road shall be left in such perfect condition that water will not penetrate, but will flow quickly towards the side ditches. Rolling may be done with a steam roller, a heavy horse roller, a traction engine followed by a weighted field roller to smooth out the lug marks, or a weighted field roller and a smoothing harrow used alternately until each course is thoroughly compacted and smooth.

CLASS "B."

GRAVEL ROAD.

Grading:

The roadway shall be graded so as to strictly conform to the plans and specifications for the particular road to be built, which plans and specifications have been submitted to and approved by the state highway commissioner. The finished road shall be not less than eighteen feet between side ditches and have a cross-section oval in form with an average rise of one inch to the foot from the edge of the side ditch to the center line of the road. The greatest width recommended is twenty-four feet between side ditches with a cross-section similar in form to that described for an eighteen-foot roadway.

Drainage:

The side ditches shall have true grades and sufficient incline to furnish a free and uniform flow of water to the nearest natural outlets, which outlets must be so improved where necessary, as to carry the water quickly away from the highway. The inner slope of the ditches shall be not steeper than two horizontal to one vertical and the outer slope shall be not steeper than one and one-half horizontal to one vertical. Tile drains shall be laid where needed.

Gravel bed and shoulders:

After the road has been graded as above described the gravel bed shall be formed in the central part of the road grade as follows: Shoulders of firm earth, or other suitable material shall be placed on each side of the gravel bed, not less than nine feet apart, or such greater distance as may be required to retain the width of gravel specified. The shoulders shall extend to the side ditches at the same grade and

curvature as required for the finished road. The shoulders may be formed by moving earth from the center of the present road grade to the sides, or by crowning the present road grade by scraping earth from the sides toward the center, or, if sufficient suitable material cannot be had along the roadway, it may be brought from other places along the line of work.

Rolling sub-grade:

After the shoulders and gravel bed have been formed as above described the whole roadway shall be rolled until no more compacting is possible. The hollows developed by this rolling shall be filled with suitable material under the direction of the officers in charge, and the roadway again rolled, and left in a solid and firm condition, sufficiently crowned to produce a roadway with the required crown when completed.

First course of gravel:

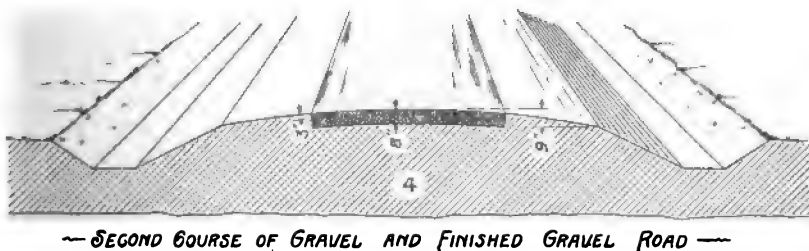
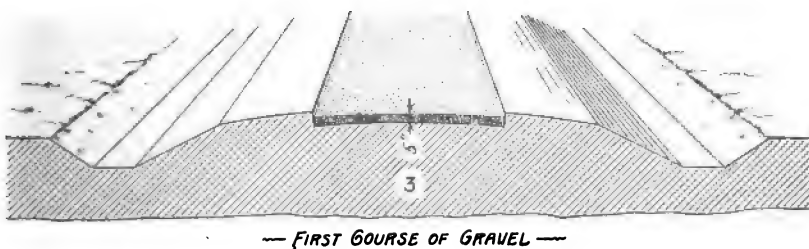
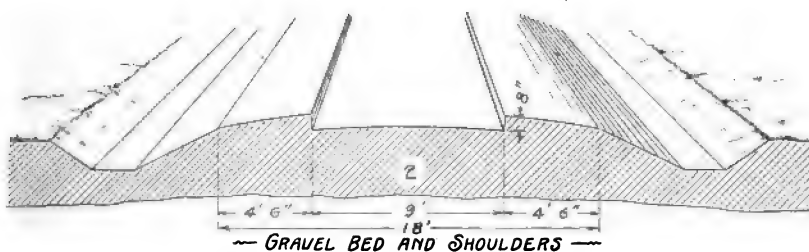
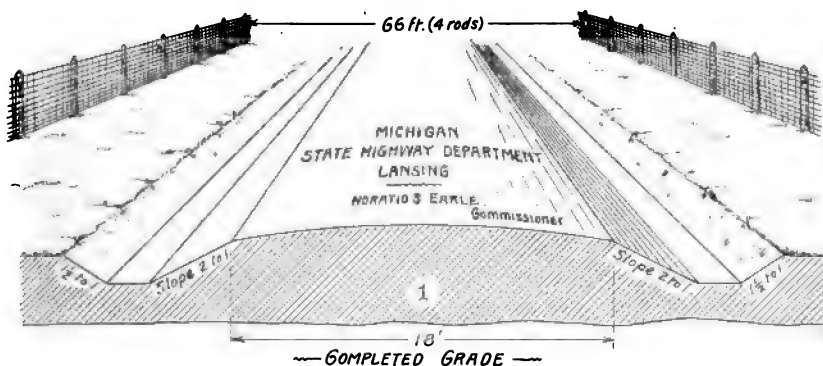
After the road has been graded and rolled in the manner above described, a layer of gravel shall be spread on the prepared bed to such uniform thickness as to be not less than five inches deep after thorough rolling. The gravel for this course shall consist of good clean bank gravel, not less than sixty per cent of which shall be pebbles that will be retained on a screen of one-eighth inch mesh, and will pass through a screen of two and one-half inch mesh, and forty per cent shall be binding material in the form of coarse sand, clay, clay and iron, or pulverized limestone. This layer of gravel shall be sprinkled thoroughly and rolled until no further compacting is possible. Any hollows that may develop during the process of rolling shall be filled with the same kind of gravel and the rolling continued until the surface is uniformly smooth and hard and everywhere parallel to, and three inches below the surface of the finished road.

Second course of gravel:

The gravel for the second course shall consist of good clean bank gravel, sixty per cent of which shall be pebbles that will be retained on a screen of one-eighth inch mesh and will pass through a screen of one and one-half inch mesh, and forty per cent shall be binding material in the form of coarse sand, clay, clay and iron or pulverized limestone. This gravel shall be spread on the road to such uniform thickness as to be not less than three inches deep after thorough rolling. This course of gravel shall be sprinkled and rolled in the same manner as prescribed for the first course, and any depressions that may be formed during the rolling shall be filled with the kind of gravel prescribed for the second course, and the road re-rolled until the surface is uniformly smooth and hard, and everywhere conforms to the proposed grade and cross-section of the road.

Rolling shall at all times begin at the sides and, rolling lengthwise of the road, proceed towards the center. In the final rolling the whole surface of the roadway including the shoulders shall be rolled from ditch to ditch and the whole road grade left in such perfect condition that water will not penetrate but will flow quickly to the side ditches. Rolling may be done with a steam roller, a heavy horse roller, a traction engine followed by a weighted field roller to smooth out the lug marks, or a weighted field roller and a smoothing harrow used alternately until each course is thoroughly compacted and smooth.

— PLANS FOR STATE REWARD GRAVEL ROAD —
 ACCORDING TO STATE SPECIFICATIONS—CLASS "B"



CLASS "C"

STONE-GRAVEL ROAD.

Grading:

The roadway shall be graded so as to strictly conform to the plans and specifications for the particular road to be built, which plans and specifications have been submitted to and approved by the state highway commissioner. The finished road shall be not less than eighteen feet between side ditches and have a cross-section oval in form, with an average rise of one inch to the foot from the edge of the side ditch to the center line of the road. The greatest width recommended is twenty-four feet between side ditches with a cross-section similar in form to that described for an eighteen-foot roadway.

Drainage:

The side ditches shall have true grades and sufficient incline to furnish a free and uniform flow of water to the nearest natural outlets, which outlets must be so improved where necessary, as to carry the water quickly away from the highway. The inner slope of the ditches shall be not steeper than two horizontal to one vertical and the outer slope shall be not steeper than one and one-half horizontal to one vertical. Tile drains shall be laid where needed.

Metal bed and shoulders:

After the road has been graded as above described the metal bed shall be formed in the central part of the road grade as follows: Shoulders of firm earth, or other suitable material, shall be placed on each side of the metal bed, not less than nine feet apart, or such greater distance as may be required to retain the width of metal specified. The shoulders shall extend to the side ditches at the same grade and curvature as required for the finished road. The shoulders may be formed by moving earth from the center of the present road grade to the sides, or by crowning the present road grade by scraping earth from the sides toward the center; or, if sufficient suitable material cannot be had along the roadway, it may be brought from other places along the line of work.

Rolling sub-grade:

After the shoulders and metal bed have been formed as above described the whole roadway shall be rolled until no more compacting is possible. The hollows developed by this rolling shall be filled with suitable material under the direction of the officers in charge, and the roadway again rolled, and left in solid and firm condition, sufficiently crowned to produce a roadway with the required crown when completed.

Crushed course of stone:

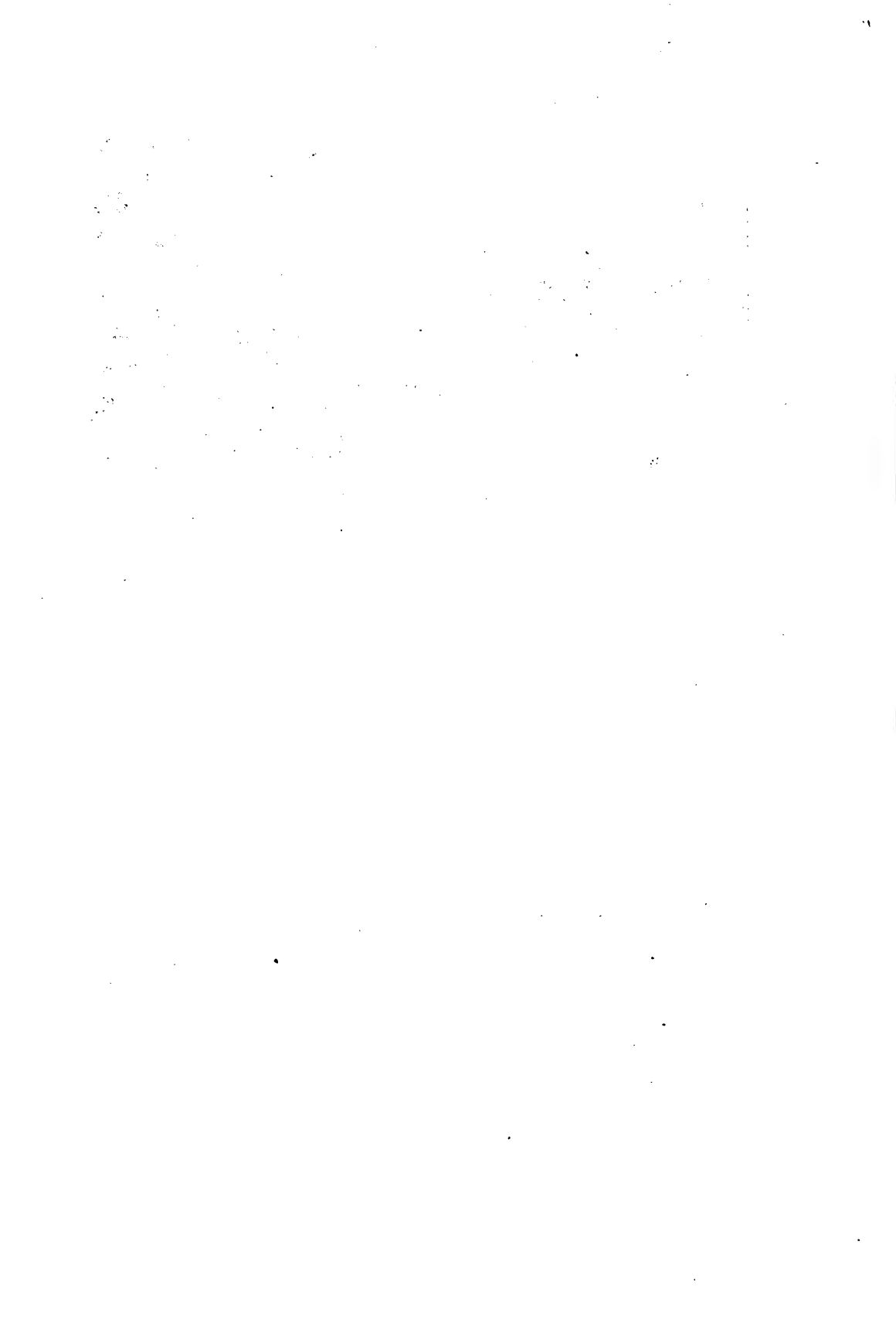
After the road has been graded and rolled in the manner above described, a layer of crushed stone shall be spread on the prepared bed to such uniform thickness as to be not less than four inches deep after thorough rolling. The stone for this course shall be of a suitable grade of crushed limestone, cobbles, or trap rock, and shall



State reward macadam road in Marquette county. Built of trap rock by county road commission.



State reward macadam road in Dickinson county. Built of trap rock by county road commission.



consist only of that part of the crusher product passing over the one-inch section and through the three-inch section of the crusher screen. This stone shall be placed upon the road uniformly mixed, no patches of alternately large and small stones being allowed. Unless automatic spreading wagons are used, this is usually best accomplished by making several dumps of each load, so that the least possible amount of handling with shovels and rakes will be required.

Binder for crushed stone course:

After the stone has been spread as above described, it shall be rolled two or three times over with a roller weighing not less than seven tons, after which one-half to three-quarters of an inch of stone screenings or bank gravel shall be uniformly spread thereon, and the whole re-rolled. The amount of binder used shall be somewhat less than enough to fill the voids in the stone. Water may be applied in advance of the roller after the binder is added, if ordered by the officers in charge, but it should be used sparingly on clay sub-grades. The rolling must be continued until the binder is worked into the crevices of the larger stones and the stones cease to sink or creep beneath the roller. If depressions are formed they shall be filled with stones of suitable grade, and not with screenings. Stone screenings (which are preferable) used to bind this course may be that part of the crusher product passing through the one-inch section of the crusher screen when crushing the stones used for this course. Gravel when used for binder shall be clean bank gravel of the kind herein-after specified for the gravel top.

Gravel top:

After the rolling above specified the stone course shall be covered with a layer of gravel of such thickness as to make a uniform depth of three inches after compacting. The gravel shall be clean bank gravel, sixty per cent of which shall be pebbles that will be retained on a screen of one-eighth inch mesh and pass through a screen of one and one-half inch mesh, and forty per cent shall be binding material in the form of coarse sand, clay, clay and iron, or pulverized limestone. This course shall be sprinkled thoroughly and rolled until no further compacting is possible. Any hollows that may develop in this gravel top during the process of rolling shall be filled with the same kind of gravel and the rolling continued until the surface is uniformly smooth and hard, and everywhere conforms to the proposed grade and cross section of the road.

Manner of rolling:

Rolling shall at all times begin at the sides and, rolling lengthwise of the road, proceed toward the center. In the final rolling the whole surface of the roadway including the shoulders, shall be rolled from ditch to ditch, and the whole road grade left in such perfect condition that water will not penetrate but will flow quickly to the side ditches. Rolling of the macadam course must be done with a roller weighing not less than seven tons. The gravel course may be rolled with a steam roller, a heavy horse roller, a traction engine followed by a weighted field roller to smooth out the lug marks, or a weighted field roller and a smoothing harrow used alternately until the course is thoroughly compacted and smooth.

CLASS "D"

GRAVEL-STONE ROAD.

Grading:

The roadway shall be graded so as to strictly conform to the plans and specifications for the particular road to be built, which plans and specifications have been submitted to and approved by the state highway commissioner. The finished road shall be not less than eighteen feet between side ditches and have a cross-section oval in form, with an average rise of one inch to the foot from the edge of the side ditch to the center line of the road. The greatest width recommended is twenty-four feet between side ditches with a cross-section similar in form to that described for an eighteen-foot roadway.

Drainage:

The side ditches shall have true grades and sufficient incline to furnish a free and uniform flow of water to the nearest natural outlets, which outlets must be so improved where necessary, as to carry the water quickly away from the highway. The inner slope of the ditches shall be not steeper than two horizontal to one vertical and the outer slope shall be not steeper than one and one-half horizontal to one vertical. Tile drains shall be laid where needed.

Metal bed and shoulders:

After the road has been graded as above described the metal bed shall be formed in the central part of the road grade as follows: Shoulders of firm earth, or other suitable material, shall be placed on each side of the metal bed, not less than nine feet apart, or such greater distance as may be required to retain the width of metal specified. The shoulders shall extend to the side ditches at the same grade and curvature as required for the finished road. The shoulders may be formed by moving earth from the center of the present road grade to the sides, or by crowning the present road grade by scraping earth from the sides toward the center, or, if sufficient suitable material cannot be had along the roadway, it may be brought from other places along the line of work.

Rolling sub-grade

After the shoulders and metal bed have been formed as above described the whole roadway shall be rolled until no more compacting is possible. The hollows developed by this rolling shall be filled with suitable material under the direction of the officers in charge, and the roadway again rolled, and left in solid and firm condition, sufficiently crowned to produce a roadway with the required crown when completed.

Gravel bottom:

After the road has been graded and rolled in the manner above described, a layer of gravel shall be spread on the prepared bed to such uniform thickness as to be not less than four inches deep after thorough rolling. The gravel for this course shall consist of good clean bank gravel, not less than sixty per cent of which shall be pebbles that will be retained on a screen of one-eighth inch mesh, and pass through a screen of two and one-half inch mesh, and forty per cent shall be binding material in the form of coarse sand, clay, clay and iron, or pulverized limestone. This layer of gravel shall be sprinkled thoroughly and rolled until no further compacting is pos-

sible. Any hollows that may develop during the process of rolling shall be filled with the same kind of gravel and the rolling continued until the surface is uniformly smooth and hard and everywhere parallel to, and three inches below the surface of the finished road.

Macadam top:

After the gravel course has been applied and rolled as above specified, a layer of crushed stone shall be added, of such uniform thickness as to be not less than three inches deep after thorough rolling. The stone for this course may be of a suitable grade of crushed limestone, cobbles, or trap rock, and shall consist of that part of the crusher product passing over the half-inch section and through the two-inch section of the crusher screen. This stone shall be placed upon the road uniformly mixed, no patches of alternately large and small stones being allowed. Unless automatic spreading wagons are used, this is usually best accomplished by making several dumps of each load, so that the least possible amount of handling with shovels and rakes will be required.

Binder for macadam top:

After the stone has been spread as above described, it shall be rolled two or three times over with a roller weighing not less than seven tons, after which about three-quarters of an inch of stone screenings shall be uniformly spread thereon. The screenings may consist of that part of the crusher product passing through the half inch section of the crusher screen when crushing stone for the macadam top. The amount of screenings used must slightly more than fill the voids in the larger stones. After the screenings are added, water shall be applied in sufficient quantity and the road rolled until it becomes so hard that a piece of rock will crush beneath the roller before penetrating the surface. If depressions are formed they shall be filled with smaller stones of suitable grade, and not with screenings. During the progress of the work the screenings will disappear in places when more screenings must be added and the rolling and sprinkling continued until the road has a uniformly hard and even surface, and everywhere conforms to the proposed grade and cross-section of the road.

Manner of rolling:

Rolling shall at all times begin at the sides and, rolling lengthwise of the road, proceed toward the center. In the final rolling the whole surface of the roadway including the shoulders, shall be rolled from ditch to ditch, and the whole road grade left in such perfect condition that water will not penetrate but will flow quickly to the side ditches. Rolling of the macadam course must be done with a roller weighing not less than seven tons. The gravel course may be rolled with a steam roller, a heavy horse roller, a traction engine followed by a weighted field roller to smooth out the lug marks, or a weighted field roller and a smoothing harrow used alternately until the course is thoroughly compacted and smooth.

CLASS "E"
MACADAM ROAD.

Grading:

The roadway shall be graded so as to strictly conform to the plans and specifications for the particular road to be built, which plans and specifications have been submitted to and approved by the state highway commissioner. The finished road shall be not less than eighteen feet between side ditches and have a cross-section oval in form with an average rise of one inch to the foot from the edge of the side ditch to the center line of the road. The greatest width recommended is twenty-four feet between side ditches with a cross-section similar in form to that described for an eighteen-foot roadway.

Drainage:

The side ditches shall have true grades and sufficient incline to furnish a free and uniform flow of water to the nearest natural outlets, which outlets must be so improved where necessary, as to carry the water quickly away from the highway. The inner slope of the ditches shall be not steeper than two horizontal to one vertical and the outer slope shall be not steeper than one and one-half horizontal to one vertical. Tile drains shall be laid where needed.

Macadam bed and shoulders:

After the road has been graded as above described the macadam bed shall be formed in the central part of the road grade as follows: Shoulders of firm earth, or other suitable material, shall be placed on each side of the macadam bed, not less than nine feet apart, or such greater distance as may be required to retain the width of macadam specified. The shoulders shall extend to the side ditches at the same grade and curvature as required for the finished road. The shoulders may be formed by moving earth from the center of the present road grade to the sides, or by crowning the present road grade by scraping earth from the sides toward the center, or, if sufficient suitable material cannot be had along the roadway, it may be brought from other places along the line of work.

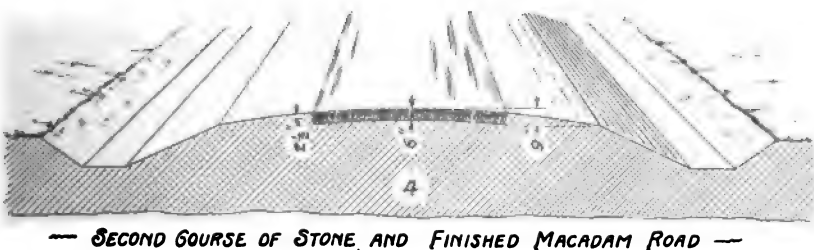
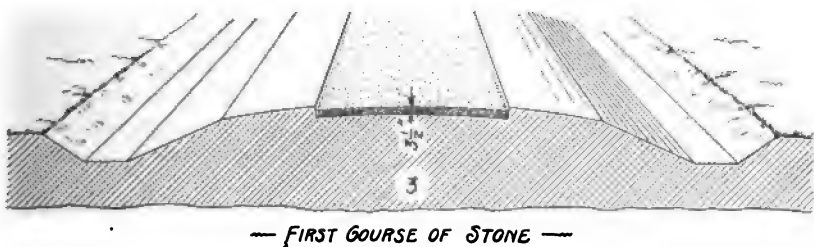
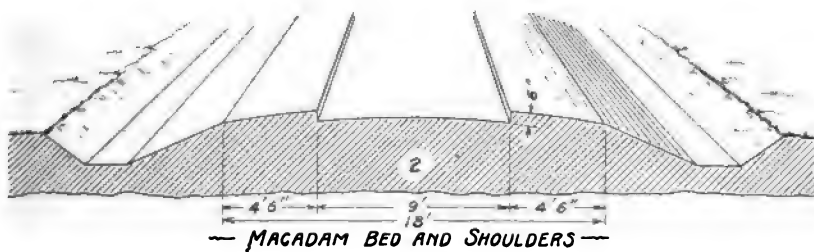
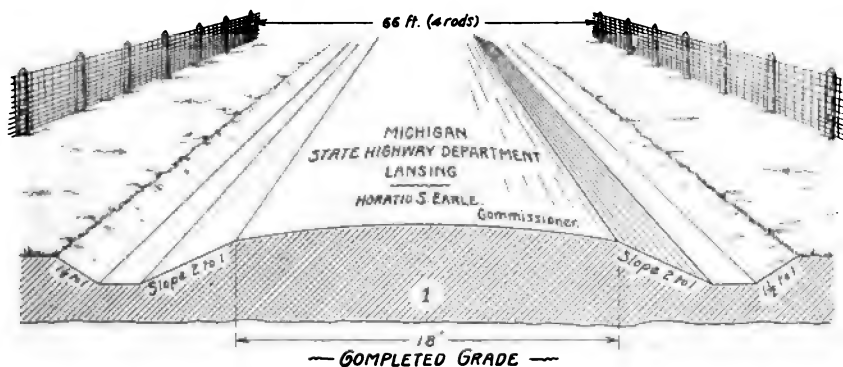
Rolling sub-grade:

After the shoulders and macadam bed have been formed as above described the whole roadway shall be rolled until no more compacting is possible. The hollows developed by this rolling shall be filled with suitable material under the direction of the officers in charge, and the roadway again rolled, and left in a solid and firm condition, sufficiently crowned to produce a roadway with the required crown when macadamized.

First course of macadam:

After the road has been graded and rolled in the manner above described, a layer of crushed stone shall be spread on the prepared bed to such uniform thickness as to be not less than three and one-half inches deep after thorough rolling. The stone for this course shall be of a suitable grade of crushed limestone, cobbles or trap rock, and shall consist of that part of the crusher product passing over the one-inch section and through the three-inch section of the crusher screen. This stone shall be placed upon the road uniformly mixed, no patches of alternately large and small stones being allowed. Unless automatic

— PLANS FOR STATE REWARD MACADAM ROAD —
 ACCORDING TO STATE SPECIFICATIONS — CLASS "E" —



spreading wagons are used, this is usually best accomplished by making several dumps of each load, so that the least possible amount of handling with shovels and rakes will be required.

Binder for first course of macadam:

After the stone has been spread as above described, it shall be rolled two or three times over with a roller weighing not less than seven tons, after which one-half to three-quarters of an inch of stone screenings shall be uniformly spread thereon and the whole re-rolled. The amount of screenings used shall be somewhat less than enough to fill the voids in the coarser stones. Water may be applied in advance of the roller, after the binder is added, if ordered by the officers in charge, but it should be used sparingly on clay sub-grades. The rolling must be continued until the binder is worked into the crevices of the larger stones and the stones cease to sink or creep beneath the roller. The stone screenings used may be that part of the crusher product passing through the one-inch section of the crusher screen when crushing macadam for this course.

Top course of macadam:

After the first course of macadam has been finished as above specified, a second layer of crushed stone shall be added, of such uniform thickness as to be not less than two and one-half inches deep after thorough rolling. The stone for this course shall be of a suitable grade of crushed limestone, cobbles or trap rock, and shall consist of that part of the crusher product passing over the one-half inch and through the two-inch sections of the crusher screen. The stone shall be placed upon the road and spread in exactly the same manner as prescribed for the first course of macadam.

Binder for macadam top:

After the preliminary rolling, about three-quarters of an inch of stone screenings shall be uniformly spread thereon. The screenings may consist of that part of the crusher product passing through the half-inch or one inch sections of the crusher screen when crushing stone for either course of macadam. The amount of screenings used must be slightly more than enough to fill the voids in the larger stones. After the screenings are added, water shall be applied in sufficient quantity, and the road rolled and watered until it becomes so hard that pieces of rock will crush beneath the roller before penetrating the surface. If depressions are formed when rolling either course of macadam, they shall be filled with the smaller stones of suitable grade, and not with screenings. During the progress of the work the screenings will disappear in places when more screenings must be added, and the rolling and sprinkling continued until the road has a uniformly hard and even surface and everywhere conforms to the proposed grade and cross-section of the road.

Manner of rolling:

Rolling shall at all times begin at the sides and rolling lengthwise of the road proceed towards the center. In the final rolling the whole surface of the roadway including the shoulders, shall be rolled from ditch to ditch and the whole road grade left in such perfect condition that water will not penetrate but will flow quickly to the side ditches. Rolling must be done with a roller weighing not less than seven tons.



Homestead township road site, Benzie county, before improvement.



Homestead township, Benzie county, gravel road. Contains so large a percentage of pebbles that it packs slowly but will outwear any of the quick-to-pack gravels.

ST OF

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LIST OF APPLICATIONS FOR STATE REWARD ON FILE DE- CEMBER 1, 1908.

1.	Tuscola County, Elkland Township, 1 mile gravel road, reward	\$ 500 00
	Paid Oct. 20, 1905.	
2.	Saginaw County, 2 miles macadam road, reward	2,000 00
	Paid Oct. 20, 1905.	
3.	Oceana County, Shelby Township, 1 $\frac{1}{4}$ miles macadam road, reward	1,250 00
	Paid Nov. 1, 1905.	
4.	Dickinson County, 1.025 miles macadam road, reward..	1,025 00
	Paid Nov. 22, 1905.	
5.	St. Clair County, Port Huron Township, 2.395 miles macadam road, reward	2,395 00
	Paid Nov. 4, 1905, Nov. 10, 1906 and Oct. 18, 1907.	
6.	Kent County, Tyrone Township, 2 miles gravel road, re- ward	1,000 00
	Paid Dec. 20, 1905.	
7.	Macomb County, Warren Township, 2 miles macadam road, reward	2,000 00
	Paid Aug. 21, 1906.	
8.	Charlevoix County, Charlevoix Township, 1.568 miles ma- cadam road, reward	1,568 00
	Cancelled.	
9.	Barry County, Rutland Township, 1 mile gravel road, reward	500 00
	Paid July 5, 1906.	
10.	Bay County, 1 3 $\frac{1}{4}$ miles macadam road, reward.....	1,750 00
	Paid July 7, 1906.	
11.	Berrien County, Hagar Township, 1 mile gravel road, reward	500 00
	Cancelled.	
12.	Kalkaska County, 1 mile macadam road, reward.....	1,000 00
	Paid July 27, 1906 and Sept. 8, 1906.	
13.	Oakland County, Bloomfield Township, 2.14 miles gravel road, reward	1,070 00
	\$535 paid Nov. 9, 1908.	
14.	Eaton County, Hamlin Township, 1 mile gravel road, re- ward	500 00
	Paid Dec. 1, 1905.	
15.	Ionia County, Ionia Township, 1.06 miles gravel road, reward	530 00
	Cancelled.	
16.	Sanilac County, Moore Township, 2 miles gravel road, reward	1,000 00
	Cancelled.	
17.	Oakland County, Farmington Township, 1.136 miles gravel road, reward	568 00
	Cancelled.	

STATE HIGHWAY DEPARTMENT

18.	VanBuren County, Paw Paw Township, 2 miles gravel road, reward	\$1,000 00
	Cancelled.	
19.	Saginaw County, St. Charles Township, 1½ miles gravel road, reward	750 00
	Application rejected.	
20.	Dickinson County, 1.023 miles macadam road, reward.	1,023 00
	Paid Nov. 22, 1905 and Nov. 19, 1906.	
21.	Gratiot County, Arcada Township, 1 mile gravel road, reward	500 00
	Paid Dec. 1, 1905 and Sept. 20, 1906.	
22.	Menominee County, 1 mile macadam road, reward.....	1,000 00
	Paid Nov. 24, 1905.	
23.	Menominee County, 1 1-2 miles gravel road, reward....	750 00
	Paid Nov. 24, 1905.	
24.	Manistee County, 2 miles gravel road, reward.....	1,000 00
	Paid Nov. 20, 1906.	
25.	Gratiot County, Pine River Township, 1 mile gravel road, reward	500 00
	Paid Dec. 1, 1905 and May 15, 1906.	
26.	Washtenaw County, Salem Township, 1 mile gravel road, reward	500 00
	Cancelled.	
27.	Ingham County, Lansing Township, 2 miles macadam road, reward	2,000 00
	Paid Sept. 28, 1906 and Nov. 22, 1906.	
28.	Osceola County, Evart Township, 2 miles gravel road, reward	1,000 00
	Paid Nov. 24, 1906, Nov. 29, 1907 and Nov. 7, 1908.	
29.	Manistee County, 1½ miles gravel road, reward....	750 00
	Paid Nov. 20, 1906.	
30.	Tuscola County, Elkland Township, 2 miles gravel road, reward	1,000 00
	Paid July 7, 1906 and Nov. 13, 1906.	
31.	Saginaw County, 1.07 miles macadam road, reward....	1,070 00
	Paid July 31, 1906.	
32.	Saginaw County, 1.11 miles gravel road, reward.....	555 00
	Paid May 9, 1907 and Sept. 3, 1907.	
33.	Saginaw County, .497 mile macadam road, reward.....	497 00
	Paid Aug. 15, 1906.	
34.	Saginaw County, 1.489 miles macadam road, reward... ..	1,489 00
	\$1,452 paid Nov. 30, 1906 and Aug. 10, 1907.	
35.	Saginaw County, 1.18 miles macadam road, reward....	1,180 00
	Paid July 31, 1906.	
36.	Saginaw County, 1.043 miles macadam road, reward ...	1,043 00
	Paid Sept. 5, 1906.	
37.	Saginaw County, 1½ miles macadam road, reward... ..	1,500 00
	\$1,224 paid July 31, 1906 and Oct. 16, 1908.	
38.	Iosco County, Au Sable Township, 2 miles gravel road, reward	1,000 00
	Cancelled.	
39.	Gratiot County, Bethany Township, ¾ mile gravel road, reward	375 00
	Cancelled.	

40.	Gratiot County, Bethany Township, 1 mile gravel road, reward	\$500 00
	Cancelled.	
41.	Manistee County, 1.85 miles gravel road, reward..... Paid June 16, 1906.	925 00
42.	Mecosta County, Morton Township, 2 miles gravel road, reward	1,000 00
	Paid July 14, 1906 and Sept. 10, 1906.	
43.	Manistee County, 1 1-2 miles gravel road, reward..... Paid Aug. 15, 1906 and Nov. 20, 1906.	750 00
44.	Cheboygan County, 1.519 miles "C" road, reward..... Paid Nov. 17, 1906 and July 27, 1907.	1,139 00
45.	Bay County, 2 miles macadam road, reward	2,000 00
	Paid Oct. 16, 1906.	
46.	Mason County, 1 mile macadam road, reward	1,000 00
	Paid Oct. 10, 1906.	
47.	Mason County, 1 mile macadam road, reward	1,000 00
	Paid June 27, 1906.	
48.	Mason County, 1 mile macadam road, reward	1,000 00
	Paid Oct. 24, 1906.	
49.	Mason County, 1 mile macadam road, reward	1,000 00
	Paid Oct. 16, 1906.	
50.	Tuscola County, Millington Township, 2 1-5 miles gravel road, reward	1,100 00
	Paid Nov. 13, 1906 and July 1, 1907.	
51.	Monroe County, Ash Township, 1 mile "C" road, reward Cancelled.	750 00
52.	Delta County, 1½ miles macadam road, reward..... Paid Sept. 8, 1906, Nov. 9, 1906 and Sept. 17, 1907.	1,500 00
53.	Delta County, ½ mile macadam road, reward	500 00
	Paid Sept. 8, 1906.	
54.	Lenawee County, Ogden Township, 2 miles "C" road, reward	1,500 00
	Cancelled.	
55.	Lenawee County, Ogden Township, 2 miles "C" road, reward	1,500 00
	Cancelled.	
56.	Kalkaska County, 1 mile "D" road, reward..... Paid Oct. 23, 1906.	750 00
57.	Kalkaska County, 1 mile macadam road, reward..... Paid July 27, 1906 and Sept. 8, 1906.	1,000 00
58.	Kalkaska County, 1.004 miles gravel road, reward..... Paid July 6, 1907.	502 00
59.	Kent County, Tyrone Township, ½ mile gravel road, reward	250 00
	Paid Jan. 4, 1907.	
60.	Kent County, Tyrone Township, 1.004 miles gravel road, reward	502 00
	Paid Nov. 7, 1907.	
61.	Kent County, Tyrone Township, ½ mile gravel road, reward	250 00
	Paid Jan. 4, 1907.	
62.	Jackson County, Henrietta Township, 1 mile macadam road, reward	1,000 00
	Paid Nov. 12, 1906.	

63.	Gratiot County, Pine River Township, 1 mile gravel road, reward	\$500 00
	Paid Sept. 5, 1906.	
64.	Gratiot County, Pine River Township, 1 mile gravel road, reward	500 00
	Paid Oct. 5, 1906.	
65.	St. Clair County, Port Huron Township, 1.287 miles macadam road, reward	1,287 00
	Paid Nov. 10, 1906 and July 1, 1907.	
66.	St. Clair County, Port Huron Township, .703 mile macadam road, reward	703 00
	Paid Nov. 10, 1906.	
67.	Grand Traverse County, Peninsula Township, 1 mile gravel road, reward	500 00
	Cancelled.	
68.	Gratiot County, Seville Township, 1 mile gravel road, reward	500 00
	Cancelled.	
69.	Oceana County, Shelby Township, 1.818 miles macadam road, reward	1,818 00
	Paid Nov. 16, 1906 and Sept. 1, 1906.	
70.	Alpena County, 1.458 miles macadam road, reward	1,458 00
	Cancelled.	
71.	Gratiot County, Sumner Township, 1 mile gravel road, reward	500 00
	Cancelled.	
72.	Gratiot County, Sumner Township, 1 mile gravel road, reward	500 00
	Almost completed.	
73.	Saginaw County, .948 mile macadam road, reward....	948 00
	Paid Aug. 11, 1908 and Aug. 28, 1908.	
74.	Oceana County, Ferry Township, 1.055 miles macadam road, reward	1,055 00
	Building.	
75.	Manistee County, 2 miles gravel road, reward	1,000 00
	\$628 paid Oct. 12, 1907.	
76.	Manistee County, .578 mile gravel road, reward.....	289 00
	Paid July 1, 1907.	
77.	Monroe County, Monroe Township, 1 mile macadam road, reward	1,000 00
	Cancelled.	
78.	Monroe County, Bedford Township, 2 miles macadam road, reward	2,000 00
	\$1,000 paid July 11, 1907.	
79.	Saginaw County, .497 mile macadam road, reward.....	497 00
	Paid Aug. 15, 1906.	
80.	Saginaw County, .997 mile macadam road, reward	997 00
	Paid Aug. 15, 1906.	
81.	Saginaw County, .991 mile macadam road, reward	991 00
	Paid Nov. 30, 1906 and Sept. 26, 1907.	
82.	Oceana County, Ferry Township, 1 mile gravel road, reward	500 00
	Building.	
83.	Berrien County, St. Joseph Township, 1.42 miles macadam road, reward	1,420 00
	\$730 paid Sept. 20, 1906.	

84.	Berrien County, St. Joseph Township, .97 mile macadam road, reward	\$970 00
	Paid Sept. 20, 1906 and July 8, 1907.	
85.	Berrien County, St. Joseph Township, 2.05 miles macadam road, reward	2,050 00
	\$1,049 paid Sept. 20, 1906 and Nov. 14, 1906.	
86.	Berrien County, St. Joseph Township, 1.60 miles macadam road, reward	1,600 00
	Paid Sept. 20, 1906 and July 8, 1907.	
87.	Berrien County, St. Joseph Township, .754 mile macadam road, reward	502 00
	Paid July 1, 1908.	
88.	Berrien County, St. Joseph Township, 1.05 miles macadam road, reward	1,050 00
	\$322 paid July 1, 1907.	
89.	Berrien County, St. Joseph Township, 1.55 miles macadam road, reward	1,550 00
	\$1,212 paid Nov. 14, 1906 and July 1, 1907.	
90.	Eaton County, Eaton Rapids Township, 1.074 miles gravel road, reward	537 00
	Paid Mar. 18, 1907, Dec. 2, 1907 and Apr. 14, 1908.	
91.	Antrim County, Mancelona Township, 4.166 miles gravel road, reward	2,083 00
	Paid Sept. 8, 1906, July 1, 1907, Sept. 13, 1907, Nov 1, 1907 and July 1, 1908.	
92.	Lenawee County, Tecumseh Township, 2 miles gravel road, reward	1,000 00
	Cancelled.	
93.	Wayne County, Hamtramck Township, 2 miles macadam road, reward	2,000 00
	Cancelled.	
94.	Wayne County, Hamtramck Township, 3 miles macadam road, reward	3,000 00
	Cancelled.	
95.	Wayne County, Hamtramck Township, 2 miles macadam road, reward	2,000 00
	Cancelled.	
96.	Berrien County, Royalton Township, 2.91 miles macadam road, reward	2,910 00
	Paid Oct. 30, 1907, Nov. 29, 1907 and May 18, 1908.	
97.	Berrien County, Royalton Township, 3.66 miles macadam road, reward	3,660 00
	\$2,789 paid Dec. 11, 1907 and July 1, 1908.	
98.	Tuscola County, Elkland Township, ½ mile gravel road, reward	250 00
	Paid Nov. 13, 1906.	
99.	Van Buren County, South Haven Township, 1 mile gravel road, reward	500 00
	Cancelled.	
100.	Van Buren County, South Haven Township, 1½ miles gravel road, reward	750 00
	Cancelled.	
101.	Sanilac County, Lexington Township, 1 mile macadam road, reward	1,000 00
	Paid Oct. 16, 1908.	

102.	Berrien County, Lincoln Township, 2½ miles macadam road, reward	\$2,500 00
103.	Berrien County, Lincoln Township, 4.49 miles macadam road, reward	4,490 00
104.	Gratiot County, Arcada Township, 2 miles gravel road, reward	1,000 00
	Paid Sept. 20, 1906 and Sept. 10, 1907.	
105.	Allegan County, Otsego Township, 1 mile gravel road, reward	500 00
	Cancelled.	
106.	Berrien County, Lincoln Township, 3.884 miles macadam road, reward	3,884 00
107.	Shiawassee County, Vernon Township, 1 mile gravel road, reward	500 00
	Cancelled.	
108.	Clare County, Arthur Township, 1.056 miles "A" road, reward	264 00
	Cancelled.	
109.	Oceana County, Newfield Township, 1 mile gravel road, reward	500 00
	Paid Nov 16, 1906.	
110.	Gratiot County, Emerson Township, 1 mile gravel road, reward	500 00
	Paid Jan. 2, 1907 and Dec. 27, 1907.	
111.	Kent County, Byron Township, 1 mile gravel road, reward	500 00
	Paid June 26, 1908.	
112.	Barry County, Rutland Township, 1.05 miles gravel road, reward	525 00
	Paid July 1, 1907.	
113.	Mason County, 1 mile "A" road, reward	250 00
	Paid Nov. 4, 1907.	
114.	Dickinson County, 2.41 miles macadam road, reward ..	2,410 00
	Paid Nov. 19, 1906 and July 1, 1907.	
115.	Montcalm County, Cato Township, 1 mile gravel road, reward	500 00
	Paid May 9, 1907.	
116.	Lake County, Newkirk Township, 1 mile gravel road, reward	500 00
	Paid Nov. 19, 1906 and Nov. 22, 1907.	
117.	Saginaw County, 1.94 miles macadam road, reward....	1,940 00
	Paid Nov. 27, 1906 and Aug. 11, 1908.	
118.	Clare County, Grant Township, 1 mile gravel road, reward	500 00
	Paid Sept. 13, 1907.	
119.	Oceana County, Hart Township, 2 miles gravel road, reward	1,000 00
120.	Tuscola County, Elkland Township, ½ mile gravel road, reward	250 00
	Paid Sept. 2, 1907.	
121.	Tuscola County, Elkland Township, 2 miles gravel road, reward	1,000 00
	Paid Sept. 2, 1907.	

122.	Mason County, 1.704 miles macadam road, reward.....	\$1,704 00
	\$1,000 paid Oct. 10, 1908.	
123.	Iosco County, 2.428 miles macadam road, reward	2,428 00
	Paid Nov. 14, 1906, Aug. 21, 1907 and Sept. 2, 1907.	
124.	Saginaw County, 1.604 miles macadam road, reward...	1,604 00
	Paid Nov. 30, 1906 and July 1, 1907.	
125.	Saginaw County, 1.063 miles macadam road, reward....	1,063 00
	Paid July 1, 1907.	
126.	Saginaw County, 1.144 miles macadam road, reward...	1,144 00
	Paid Nov. 30, 1906 and July 13, 1907.	
127.	Mason County, 1/2 mile macadam road, reward	500 00
	Paid Nov. 22, 1907.	
128.	Mason County, 1.002 miles macadam road, reward.....	1,002 00
	Paid Nov. 22, 1907 and Oct. 10, 1908.	
129.	Delta County, 1.56 miles macadam road, reward.....	1,560 00
130.	Delta County, 2 miles macadam road, reward.....	2,000 00
131.	Delta County, 2 miles macadam road, reward.....	2,000 00
132.	Delta County, 1.453 miles macadam road, reward.....	1,453 00
133.	Delta County, 2 miles macadam road, reward.....	2,000 00
134.	Delta County, 2 miles macadam road, reward	2,000 00
	Paid Nov. 9, 1908.	
135.	Bay County, 1.565 miles macadam road, reward.....	1,565 00
	Paid Oct. 4, 1907 and Dec. 18, 1907.	
136.	Bay County, 1/2 mile macadam road, reward.....	500 00
	Paid Oct. 14, 1907.	
137.	Bay County, 1/2 mile macadam road, reward	500 00
	\$401 paid Dec. 13, 1907.	
138.	Bay County, 1/2 mile macadam road, reward	500 00
	Paid Nov. 27, 1906.	
139.	Osceola County, Osceola Township, 1 mile gravel road, reward	500 00
	Paid Dec. 4, 1907.	
140.	Bay County, 1/2 mile macadam road, reward	500 00
	Application rejected.	
141.	St. Clair County, Port Huron Township, 1.520 miles macadam road, reward	1,520 00
	\$1,008 paid Oct. 18, 1907 and July 1, 1908.	
142.	St. Clair County, Port Huron Township, .996 mile ma- cadam road, reward	996 00
	\$832 paid Oct. 18, 1907.	
143.	Bay County, 3/4 mile macadam road, reward	750 00
	Application rejected.	
144.	Marquette County, 1 mile macadam road, reward	1,000 00
	Paid Oct. 17, 1907.	
145.	Manistee County, 1 mile gravel road, reward	500 00
	Paid Oct. 10, 1908.	
146.	Berrien County, Chikaming Township, 1 mile gravel road, reward	500 00
147.	Gratiot County, Pine River Township, 2 miles gravel road, reward	1,000 00
	Paid July 1, 1907 and Oct. 31, 1907.	
148.	Mecosta County, Wheatland Township, 1.956 miles gravel road, reward	978 00
	Paid Dec. 11, 1907 and Nov. 17, 1908.	

149.	Saginaw County, Brady Township, 1.476 miles gravel road, reward	\$738 00
150.	Manistee County, 1.046 miles gravel road, reward..... Paid Oct. 5, 1907.	523 00
151.	Manistee County, 1.498 miles gravel road, reward..... Paid Oct. 5, 1907.	749 00
152.	Manistee County, 1½ miles gravel road, reward	750 00
	\$650 paid Oct. 10, 1908.	
153.	Osceola County, Orient Township, 1 mile gravel road, reward	500 00
	Paid Nov. 1, 1907.	
154.	Saginaw County, Chesaning Township, 2.499 miles macadam road, reward	2,499 00
	\$1,000 paid Oct. 10, 1908.	
155.	Tuscola County, Elmwood Township, 3 miles gravel road, reward	1,500 00
	\$1,000 paid Nov. 21, 1907.	
156.	Huron County, Sand Beach Township, 1.042 miles gravel road, reward	521 00
	Paid Nov. 9, 1908.	
157.	Cheboygan County, 2.556 miles "C" and "E" road, reward	2,301 00
	Paid Aug. 8, 1907 and Nov. 2, 1908.	
158.	Van Buren County, Pine Grove Township, 1½ miles gravel road, reward	750 00
	Building.	
159.	Mecosta County, Morton Township, 2 miles gravel road, reward	1,000 00
160.	Bay County, 2 4-5 miles macadam road, reward..... \$2,000 paid May 29, 1908.	2,800 00
161.	Bay County, 2 miles macadam road, reward	2,000 00
162.	Kalkaska County, 1.214 miles gravel road, reward..... Paid July 6, 1907.	607 00
163.	Kalkaska County, 1.156 miles gravel road, reward..... Paid Sept. 13, 1907.	578 00
164.	Kalkaska County, 1.004 miles gravel road, reward..... Paid July 6, 1907.	502 00
165.	Berrien County, St. Joseph Township, .642 mile macadam road, reward	642 00
	Paid Sept. 2, 1907 and July 1, 1908.	
166.	Benzie County, Benzonina Township, 1.004 miles gravel road, reward	502 00
	Paid Nov. 7, 1907.	
167.	Tuscola County, Almer Township, 1 mile macadam road, reward	1,000 00
	Paid Sept. 6, 1907.	
168.	Oceana County, Newfield Township, ¼ mile gravel road, reward	125 00
	Paid Nov. 2, 1908.	
169.	Oceana County, Newfield Township, ½ mile gravel road, reward	250 00
170.	Oceana County, Newfield Township, ½ mile gravel road, reward	250 00
	\$125 paid Nov. 2, 1908.	

171.	Oceana County, Newfield Township, ½ mile gravel road, reward	\$250 00
	Paid Nov. 2, 1908.	
172.	Manistee County, .626 mile gravel road, reward.....	313 00
	Paid Oct. 5, 1907.	
173.	Manistee County, .504 mile gravel road, reward.....	252 00
	Paid Oct. 5, 1907.	
174.	Manistee County, .776 mile gravel road, reward	388 00
	Paid Oct. 5, 1907.	
175.	Saginaw County, .99 mile macadam road, reward.....	990 00
	Paid Sept. 2, 1907.	
176.	Saginaw County, .594 mile macadam road, reward.....	594 00
	Paid July 8, 1908.	
177.	Manistee County, 1⅔ miles gravel road, reward.....	834 00
178.	Oceana County, Shelby Township, 1.013 miles macadam road, reward	1,013 00
	Paid Oct. 23, 1907.	
179.	Oceana County, Shelby Township, 1.03 miles macadam road, reward	1,030 00
	Paid Dec. 17, 1907 and Sept. 19, 1908.	
180.	Tuscola County, Millington Township, 1 mile gravel road, reward	500 00
181.	Tuscola County, Millington Township, 1½ miles gravel road, reward	750 00
	Paid Nov. 4, 1907 and Oct. 14, 1908.	
182.	Kent County, Sparta Township, 1.02 miles gravel road, reward	510 00
	Paid Nov. 16, 1907.	
183.	Kent County, Sparta Township, .976 mile gravel road, reward	488 00
	Paid Nov. 21, 1907.	
184.	Kent County, Sparta Township, 1.002 miles gravel road, reward	501 00
185.	Kent County, Sparta Township, 1.06 miles gravel road, reward	530 00
186.	Antrim County, Mancelona Township, 2 miles gravel road, reward	1,000 00
	Paid Sept. 4, 1908.	
187.	Tuscola County, Ellington Township, 1 mile gravel road, reward	500 00
	Paid Nov. 12, 1907.	
188.	Eaton County, Eaton Rapids Township, ½ mile gravel road, reward	250 00
	Paid Feb. 5, 1908.	
189.	Eaton County, Eaton Rapids Township, ½ mile gravel road, reward	250 00
	Paid Nov. 2, 1908.	
190.	Eaton County, Eaton Rapids Township, .524 mile gravel road, reward	262 00
	Paid Feb. 5, 1908.	
191.	Jackson County, Henrietta Township, 1 mile macadam road, reward	1,000 00
	Paid Sept. 13, 1907.	

STATE HIGHWAY DEPARTMENT

192.	Jackson County, Henrietta Township, 1 mile gravel road, reward	\$500 00
	Paid Nov. 9, 1908.	
193.	Berrien County, St. Joseph Township, .58 mile macadam road, reward	580 00
194.	Kent County, Paris Township, 1 mile macadam road, reward	1,000 00
	Cancelled.	
195.	Kent County, Tyrone Township, 1.004 miles gravel road, reward	502 00
	Paid Nov. 9, 1907.	
196.	Kent County, Tyrone Township, 1 mile gravel road, reward	500 00
	Paid Dec. 27, 1907 and Sept. 21, 1908.	
197.	Menominee County, Ingallston Township, 1 mile gravel road, reward	500 00
	Cancelled.	
198.	Gratiot County, Arcada Township, 1.02 miles gravel road, reward	510 00
	Paid Aug. 21, 1907.	
199.	Gratiot County, Arcada Township, 1.012 miles gravel road, reward	506 00
	Paid Nov. 30, 1907.	
200.	Antrim County, Elk Rapids Township, 1.004 miles gravel road, reward	502 00
	Paid Oct. 28, 1907.	
201.	Saginaw County, .92 mile macadam road, reward.....	920 00
	Paid Aug. 7, 1908.	
202.	Saginaw County, 1.11 miles macadam road, reward....	1,110 00
	Paid Aug. 11, 1908.	
203.	Saginaw County, 1.072 miles macadam road, reward...	1,072 00
	Paid Nov. 2, 1907 and July 1, 1908.	
204.	Saginaw County, 1.998 miles macadam road, reward...	1,998 00
	Paid Sept. 2, 1907 and Aug. 7, 1908.	
205.	Saginaw County, .99 mile macadam road, reward.....	990 00
	Paid Nov. 2, 1907.	
206.	Saginaw County, .995 mile macadam road, reward....	995 00
	Paid Sept. 2, 1907.	
207.	Eaton County, Hamlin Township, ½ mile gravel road, reward	250 00
	Paid Dec. 6, 1907.	
208.	Eaton County, Hamlin Township, ½ mile gravel road, reward	250 00
	Paid Dec. 6, 1907.	
209.	Muskegon County, Norton Township, 1.481 miles macadam road, reward	1,481 00
	\$1,000 paid June 30, 1908.	
210.	Saginaw County, ½ mile macadam road, reward.....	500 00
	Paid June 26, 1907.	
211.	Saginaw County, .523 mile macadam road, reward....	523 00
	Paid June 26, 1907 and July 13, 1907.	
212.	Huron County, Verona Township, 1.002 miles gravel road, reward	501 00
	Paid Oct. 12, 1907.	



State reward macadam road in Dickinson county. Built of trap rock by county road commission.



State reward macadam road in Marquette county. Built of trap rock by county road commission.

213.	Oceana County, Golden Township, 1 mile macadam road, reward	\$1,000 00
	Paid Nov. 2, 1908.	
214.	Barry County, Rutland Township, .796 mile gravel road, reward	398 00
	Paid Sept. 26, 1908.	
215.	Calhoun County, Emmett Township, 1.596 mile gravel road, reward	798 00
	Paid Nov. 5, 1907.	
216.	Menominee County, 1.03 miles macadam road, reward..	1,030 00
	Paid Sept. 30, 1907.	
217.	Saginaw County, .56 mile macadam road, reward	560 00
	Paid Sept. 2, 1907.	
218.	Saginaw County, 1.005 miles macadam road, reward...	1,005 00
	\$754 paid July 13, 1907.	
219.	Saginaw County, .496 mile macadam road, reward.....	496 00
	Paid Sept. 2, 1907.	
220.	Dickinson County, 1.026 miles macadam road, reward..	1,026 00
	Paid Nov. 14, 1907.	
221.	Crawford County, Frederic Township, 1.062 miles gravel road, reward	531 00
	Nearly completed.	
222.	Isabella County, Coe Township, 1 mile gravel road, reward	500 00
	Paid Nov. 9, 1908.	
223.	Isabella County, Coe Township, 1 mile gravel road, reward	500 00
	Paid Oct. 27, 1908.	
224.	Charlevoix County, South Arm Township, 1 mile gravel road, reward	500 00
225.	Charlevoix County, South Arm Township, 1.06 miles gravel road, reward	530 00
226.	Saginaw County, .068 mile macadam road, reward.....	68 00
	Paid July 19, 1907.	
227.	Saginaw County, .191 mile macadam road, reward.....	191 00
	Paid July 13, 1907.	
228.	Kalkaska County, 1.254 miles gravel road, reward.....	627 00
	Paid Sept. 13, 1907.	
229.	Barry County, Rutland Township, 1.27 miles gravel road, reward	635 00
230.	Ionia County, Lyons Township, ½ mile gravel road, reward	250 00
	Cancelled.	
231.	Ionia County, Lyons Township, ½ mile gravel road, reward	250 00
	Cancelled.	
232.	Huron County, Sand Beach Township, 1.064 miles ma- cadam road, reward	1,064 00
	Paid Nov. 29, 1907.	
233.	Bay County, .274 mile macadam road, reward	274 00
	Paid Sept. 30, 1907.	
234.	Bay County, ¾ mile macadam road, reward.....	750 00
	Paid Sept. 30, 1907.	
235.	Cheboygan County, .100 mile "C" road, reward.....	75 00
	\$68 paid Aug. 8, 1907.	

STATE HIGHWAY DEPARTMENT

236.	Monroe County, Bedford Township, 1.004 miles macadam road, reward.....	\$1,004 00
	Building.	
237.	Tuscola County, Almer Township, .502 mile gravel road, reward	251 00
238.	Barry County, Rutland Township, .682 mile gravel road, reward	341 00
	\$255 Paid Sept. 30, 1907.	
239.	Menominee County, 1.524 miles gravel road, reward...	762 00
	Paid Nov. 21, 1907.	
240.	Marquette County, .465 mile macadam road, reward....	465 00
	Paid Oct. 17, 1907.	
241.	Marquette County, .35 mile macadam road, reward....	350 00
	Paid Oct. 17, 1907.	
242.	Marquette County, .521 mile macadam road, reward...	521 00
	Paid Oct. 27, 1908.	
243.	Muskegon County, 1.003 miles macadam road, reward.	1,003 00
	Paid Oct. 25, 1907.	
244.	Muskegon County, 2.254 miles macadam road, reward..	2,254 00
	Paid June 25, 1908 and July 1, 1908.	
245.	Huron County, Winsor Township, 1.013 miles macadam road, reward	1,013 00
	Paid Nov. 25, 1907.	
246.	Berrien County, St. Joseph Township, .502 mile macadam road, reward	251 00
	\$125 paid July 1, 1908.	
247.	Marquette County, 2 miles macadam road, reward.....	2,000 00
	Paid Nov. 29, 1907.	
248.	Tuscola County, Elkland Township, 1.996 miles gravel road, reward	998 00
	Paid Oct. 16, 1908 and Nov. 2, 1908.	
249.	Van Buren County, Geneva Township, 1 mile gravel road, reward	500 00
	Paid Sept. 12, 1908.	
250.	Gratiot County, Emerson Township, 1 mile gravel road, reward	500 00
251.	Gratiot County, Emerson Township, 1 mile gravel road, reward	500 00
	Paid Dec. 27, 1907.	
252.	Luce County, 1.24 miles "D" road, reward.....	930 00
253.	Osceola County, Marion Township, 2.008 miles gravel road, reward	1,004 00
	Paid Oct. 14, 1908.	
254.	Mason County, ½ mile "A" road, reward.....	125 00
255.	Mason County, ½ mile macadam road, reward.....	500 00
256.	Mason County, .355 mile macadam road, reward.....	355 00
	Paid Oct. 10, 1908.	
257.	Mason County, 1.003 miles macadam road, reward.....	1,003 00
	\$500 paid Oct. 10, 1908.	
258.	Mason County, .998 mile "D" road, reward	749 00
	\$375 paid Oct. 20, 1908.	
259.	Mason County, .748 mile gravel road, reward	374 00
	Paid Oct. 10, 1908.	
260.	Mason County, .991 mile macadam road, reward.....	991 00
	\$500 paid Oct. 10, 1908.	

261.	Mason County, 1.054 miles macadam road, reward.....	\$1,054 00
	Paid Oct. 10, 1908.	
262.	Kalkaska County, 1 mile gravel road, reward.....	500 00
	Paid Sept. 4, 1908.	
263.	Osceola County, Osceola Township, 1 mile gravel road, reward	500 00
264.	Berrien County, Benton Township, 1.008 miles macadam road, reward	504 00
	One-half mile completed.	
265.	Oakland County, Bloomfield Township, 2.010 miles gravel road, reward	1,005 00
	\$505 paid July 25, 1908.	
266.	Kalkaska County, 1.008 miles gravel road, reward.....	504 00
	Paid Sept. 4, 1908.	
267.	Mason County, ½ mile gravel road, reward.....	250 00
	Paid Oct. 10, 1908.	
268.	Muskegon County, .184 mile macadam road, reward....	184 00
	Paid Oct. 25, 1907.	
269.	St. Clair County, Port Huron Township, .511 mile macadam road, reward	511 00
	Paid Oct. 18, 1907.	
270.	Marquette County, 2 miles macadam road, reward....	2,000 00
	Paid Sept. 11, 1908.	
271.	Muskegon County, 1 mile macadam road, reward.....	1,000 00
	Paid Nov. 12, 1907.	
272.	Muskegon County, .322 mile macadam road, reward....	322 00
	Paid Nov. 25, 1907.	
273.	Tuscola County, Columbia Township, .712 mile gravel road, reward	356 00
274.	Tuscola County, Columbia Township, ½ mile macadam road, reward	500 00
275.	Manistee County, 1.002 miles gravel road, reward.....	501 00
276.	Eaton County, Hamlin Township, 1 mile gravel road, reward	500 00
	Cancelled.	
277.	Keweenaw County, Allouez Township, 2.002 miles macadam road, reward	2,002 00
	Completed.	
278.	Crawford County, Frederic Township, 1.008 miles gravel road, reward	504 00
	Building.	
279.	Bay County, .229 mile macadam road, reward	229 00
	Paid Jan. 27, 1908.	
280.	Eaton County, Hamlin Township, 1 mile gravel road, reward	500 00
	Completed.	
281.	Newaygo County, Everett Township, 1 mile gravel road, reward	500 00
282.	Manistee County, 1.38 miles gravel road, reward.....	690 00
	\$375 paid Nov. 30, 1908.	
283.	Manistee County, 1.024 miles gravel road, reward.....	512 00
284.	Manistee County, 1 mile gravel road, reward.....	500 00
285.	Manistee County, 1 mile gravel road, reward.....	500 00

286.	Saginaw County, Jonesfield Township, 4.550 miles macadam road, reward.....	\$4,550 00
	\$1,985 paid Sept. 15, 1908 and Oct. 10, 1908.	
287.	Saginaw County, Jonesfield Township, 1 mile macadam road, reward	1,000 00
	Nearly completed.	
288.	Saginaw County, 1.017 miles macadam road, reward....	1,017 00
	Paid Aug. 7, 1908.	
289.	Saginaw County, .493 mile macadam road, reward.....	493 00
	Paid July 3, 1908.	
290.	Saginaw County, .968 mile macadam road, reward.....	968 00
291.	Saginaw County, 1.097 miles macadam road, reward....	1,097 00
	Paid Oct. 16, 1908.	
292.	Saginaw County, .99 mile macadam road, reward.....	990 00
	Paid Nov. 9, 1908.	
293.	Saginaw County, 1.015 miles macadam road, reward..	1,015 00
	Paid Aug. 7, 1908.	
294.	Saginaw County, 2.11 miles macadam road, reward.....	2,110 00
	Paid Aug. 28, 1908.	
295.	Saginaw County, .505 mile macadam road, reward.....	505 00
	Paid Aug. 28, 1908.	
296.	Saginaw County, .499 mile macadam road, reward.....	499 00
	Paid Sept. 15, 1908.	
297.	Saginaw County, .497 mile macadam road, reward.....	497 00
	Paid Sept. 15, 1908.	
298.	Saginaw County, .556 mile macadam road, reward....	556 00
	Paid Aug. 28, 1908.	
299.	Calhoun County, Battle Creek Township, 1.742 miles gravel road, reward	871 00
	Paid Sept. 28, 1908.	
300.	Muskegon County, Casnovia Township, 1 mile gravel road, reward	500 00
	Paid Nov. 2, 1908.	
301.	Muskegon County, Casnovia Township, 1 mile gravel road, reward	500 00
	Completed.	
302.	Manistee County, Pleasanton Township, 1 mile gravel road, reward	500 00
	\$250 paid Sept. 4, 1908.	
303.	Tuscola County, Elmwood Township, 1.026 miles gravel road, reward	513 00
	Paid Sept. 4, 1908.	
304.	Van Buren County, Pine Grove Township, 1/2 mile gravel road, reward	250 00
305.	Van Buren County, Pine Grove Township, 3 3/4 miles gravel road, reward	1,875 00
306.	Van Buren County, Pine Grove Township, 1/2 mile gravel road, reward	250 00
307.	Van Buren County, Pine Grove Township, 3/4 mile gravel road, reward	375 00
	Nearly completed.	
308.	Van Buren County, Pine Grove Township, 1 mile gravel road, reward	500 00

309.	Van Buren County, Pine Grove Township, $\frac{1}{4}$ mile gravel road, reward	\$125 00
310.	Kent County, Tyrone Township, 1.004 miles gravel road, reward	502 00
	Paid Nov. 17, 1908.	
311.	Kent County, Tyrone Township, .992 mile gravel road, reward	496 00
	Paid Nov. 17, 1908.	
312.	Wayne County, 1.37 miles macadam road, reward.....	1,370 00
	\$1,070 paid Nov. 9, 1908.	
313.	Monroe County, Erie Township, 6.553 miles macadam road, reward	6,553 00
314.	Menominee County, 1 mile macadam road, reward.....	1,000 00
	Paid Aug. 29, 1908.	
315.	Menominee County, 1 mile macadam road, reward.....	1,000 00
	\$673 paid Aug. 29, 1908.	
316.	Menominee County, 1 mile macadam road, reward.....	1,000 00
	Paid Sept. 21, 1908.	
317.	Kent County, 1.004 miles gravel road, reward.....	502 00
	\$250 paid July 25, 1908.	
318.	Wayne County, 1.511 miles macadam road, reward....	1,511 00
	\$672 paid Nov. 17, 1908.	
319.	Tuscola County, Millington Township, .984 mile gravel road, reward	492 00
	\$156 paid Oct. 14, 1908.	
320.	Manistee County, Manistee Township, $\frac{1}{2}$ mile gravel road, reward	250 00
321.	Manistee County, Manistee Township, $\frac{1}{2}$ mile gravel road, reward	250 00
322.	Bay County, 1 mile macadam road, reward	1,000 00
	Paid Aug. 7, 1908.	
323.	Bay County, 1 mile macadam road, reward.....	1,000 00
	Paid Oct. 16, 1908.	
324.	Bay County, $\frac{1}{2}$ mile macadam road, reward.....	500 00
	Paid Oct. 16, 1908.	
325.	Bay County, 1 mile macadam road, reward	1,000 00
	Completed.	
326.	Osceola County, Hersey Township, 1 mile gravel road, reward	500 00
	Paid Nov. 17, 1908.	
327.	Shiawassee County, Bennington Township, 1 mile gravel road, reward	500 00
	Paid Sept. 12, 1908.	
328.	Tuscola County, Arbela Township, 2.004 miles gravel road, reward	1,002 00
	\$501 paid Nov. 30, 1908.	
329.	Lapeer County, North Branch Township, 1.306 miles gravel road, reward	653 00
330.	Manistee County, 1 mile gravel road, reward.....	500 00
	\$375 paid Oct. 10, 1908.	
331.	Muskegon County, .131 mile macadam road, reward....	131 00
	Paid July 1, 1908.	
332.	Muskegon County, 1.033 miles macadam road, reward...	1,033 00
	Completed.	

333.	Gratiot County, Arcada Township, 1 mile gravel road, reward	\$500 00
334.	Antrim County, Mancelona Township, ½ mile gravel road, reward	250 00
	Paid Sept. 4, 1908.	
335.	Antrim County, Mancelona Township, 1.718 miles gravel road, reward	859 00
336.	Gratiot County, Arcada Township, 1.038 miles gravel road, reward	519 00
337.	Benzie County, Gilmore Township, .438 mile gravel road, reward	219 00
	Paid Sept. 4, 1908.	
338.	Benzie County, Gilmore Township, .562 mile gravel road, reward	281 00
	Paid Sept. 4, 1908.	
339.	Ionia County, Otisco Township, 1.06 miles gravel road, reward	530 00
	One-half mile completed.	
340.	Wayne County, 2 miles macadam road, reward.....	2,000 00
	\$1,643 paid Nov. 9, 1908.	
341.	Bay County, .798 mile macadam road, reward.....	798 00
	Paid Oct. 10, 1908.	
342.	Bay County, ¼ mile macadam road, reward.....	250 00
	Paid Oct. 10, 1908.	
343.	Bay County, ½ mile macadam road, reward.....	500 00
	Paid Oct. 16, 1908.	
344.	Bay County, .704 mile macadam road, reward.....	704 00
	Completed.	
345.	Kalkaska County, Clearwater Township, 1.004 miles gravel road, reward	502 00
	Paid Oct. 5, 1908.	
346.	Kent County, 1.744 miles gravel road, reward.....	872 00
	\$250 paid July 25, 1908.	
347.	Kent County, 1.52 miles gravel road, reward.....	760 00
	\$300 paid Sept. 11, 1908.	
348.	Kent County, 1.594 miles gravel road, reward.....	797 00
	\$500 paid Nov. 17, 1908.	
349.	Tuscola County, Indianfields Township, 1 mile gravel road, reward	500 00
	Paid Sept. 15, 1908.	
350.	Huron County, Winsor Township, 1.008 miles macadam road, reward	1,008 00
	Paid Aug. 20, 1908.	
351.	Huron County, Winsor Township, 1 mile macadam road, reward	1,000 00
	Paid Aug. 20, 1908 and Oct. 5, 1908.	
352.	Delta County, Escanaba Township, 1.152 miles macadam road, reward	1,152 00
	Completed.	
353.	Calhoun County, Newton Township, 1 mile gravel road, reward	500 00
	Paid Oct. 27, 1908.	
354.	Manistee County, Marilla Township, 1 mile gravel road, reward	500 00

355.	Antrim County, Elk Rapids Township, .955 mile "D" road, reward	\$716 00
	Paid Sept. 26, 1908.	
356.	Antrim County, Elk Rapids Township, .208 mile "D" road, reward	156 00
	\$42 paid Sept. 26, 1908.	
357.	Clare County, Grant Township, 1 mile gravel road, reward	500 00
	Paid Oct. 5, 1908.	
358.	Huron County, Sebawaing Township, 1.045 miles macadam road, reward	1,045 00
	Paid Sept. 4, 1908.	
359.	Lapeer County, Almont Township, .624 mile gravel road, reward	312 00
	One-half mile completed.	
360.	Lapeer County, Almont Township, .890 mile gravel road, reward	445 00
361.	Lapeer County, Almont Township, .486 mile gravel road, reward	243 00
362.	Gratiot County, Sumner Township, 1 mile gravel road, reward	500 00
	Paid Nov. 30, 1908.	
363.	Huron County, Sebawaing Township, ½ mile macadam road, reward	500 00
364.	Osceola County, Marion Township, 1.47 miles gravel road, reward	735 00
365.	Osceola County, Marion Township, 2.466 miles gravel road, reward	1,233 00
	One mile completed.	
366.	Osceola County, Marion Township, 3.76 miles gravel road, reward	1,880 00
	One mile completed.	
367.	Osceola County, Marion Township, .426 mile gravel road, reward	213 00
368.	Muskegon County, .644 mile macadam road, reward....	644 00
	\$500 paid Oct. 10, 1908.	
369.	Muskegon County, .748 mile macadam road, reward....	748 00
	Paid Oct. 10, 1908.	
370.	Wexford County, South Branch Township, 1.004 miles gravel road, reward	502 00
	Completed.	
371.	Dickinson County, 2.54 miles macadam road, reward..	2,540 00
	\$2,441 paid Oct. 5, 1908.	
372.	Wayne County, 1½ miles macadam road, reward.....	1,500 00
	\$784 paid Nov. 30, 1908.	
373.	Montcalm County, Reynolds Township, 1.8 miles gravel road, reward	900 00
	Completed.	
374.	Gratiot County, Emerson Township, 1 mile gravel road, reward	500 00
375.	Gratiot County, Emerson Township, 1 mile gravel road, reward	500 00

376.	Ingham County, Meridian Township, 1 mile gravel road, reward	\$500 00
	Paid Nov. 2, 1908.	
377.	Oceana County, Greenwood Township, ½ mile gravel road, reward	250 00
378.	Oceana County, Greenwood Township, ½ mile gravel road, reward	250 00
379.	Ingham County, Lansing Township, 1 mile gravel road, reward	500 00
	Paid Nov. 30, 1908.	
380.	Oceana County, Shelby Township, 2.719 miles macadam road, reward	2,719 00
	One and one-quarter miles completed.	
381.	Isabella County, Vernon Township, 1.008 miles gravel road, reward	504 00
382.	St. Clair County, Port Huron Township, 1.288 miles macadam road, reward	1,288 00
383.	St. Clair County, Port Huron Township, 2.413 miles macadam road, reward	2,413 00
	\$1,000 paid Aug. 28, 1908.	
384.	Oceana County, Shelby Township, .996 mile macadam road, reward	996 00
	Paid Sept. 19, 1908.	
385.	St. Clair County, Port Huron Township, .509 mile macadam road, reward	509 00
386.	St. Clair County, Port Huron Township, .508 mile macadam road, reward	508 00
387.	Manistee County, Bear Lake Township, 1 mile gravel road, reward	500 00
388.	Oceana County, Hart Township, 1.892 miles macadam road, reward	1,892 00
	Paid Sept. 26, 1908.	
389.	Antrim County, Star Township, 1 mile gravel road, reward	500 00
	Paid Nov. 17, 1908.	
390.	Wayne County, 1 mile macadam road, reward.....	1,000 00
	\$947 paid Nov. 30, 1908.	
391.	Manistee County, Arcadia Township, 1.492 miles gravel road, reward	746 00
392.	Benzie County, Benzonia Township, 1.022 miles gravel road, reward	511 00
393.	Mecosta County, Millbrook Township, 1 mile gravel road, reward	500 00
394.	Hillsdale County, Camden Township, .502 mile gravel road, reward	251 00
395.	Hillsdale County, Camden Township, .872 mile gravel road, reward	436 00
396.	Marquette County, .264 mile macadam road, reward....	264 00
	Paid Sept. 19, 1908.	
397.	Mecosta County, Wheatland Township, 1 mile gravel road, reward	500 00

398.	Benzie County, Homestead Township, 1 mile gravel road, reward	\$500 00
	Paid Nov. 30, 1908.	
399.	Monroe County, Bedford Township, 5.08 miles macadam road, reward	5,080 00
400.	Monroe County, Bedford Township, .992 mile macadam road, reward	992 00
401.	Monroe County, Bedford Township, 1.413 miles macadam road, reward	1,413 00
402.	Wexford County, Henderson Township, 1.002 miles gravel road, reward	501 00
	Paid Oct. 20, 1908.	
403.	Alger County, 3 miles macadam road, reward.....	3,000 00
404.	Manistee County, Onekama Township, 1.04 miles gravel road, reward	520 00
405.	Ingham County, White Oak Township, 1.006 miles gravel road, reward	503 00
406.	Grand Traverse County, Whitewater Township, 1.08 miles gravel road, reward	540 00
	Paid Oct. 10, 1908.	
407.	Allegan County, Wayland Township, 1¼ miles "C" road, reward	938 00
	\$750 paid Oct. 20, 1908.	
408.	Van Buren County, Pine Grove Township, ½ mile gravel road, reward	250 00
	Completed.	
409.	Van Buren County, Pine Grove Township, ½ mile gravel road, reward	250 00
	One-quarter mile completed.	
410.	Lake County, Newkirk Township, 1 mile gravel road, reward	500 00
411.	Saginaw County, .509 mile macadam road, reward....	509 00
	Paid Sept. 15, 1908.	
412.	Saginaw County, .99 mile macadam road, reward.....	990 00
413.	Osceola County, Hersey Township, .156 mile gravel road, reward	78 00
	Paid Nov. 17, 1908.	
414.	Gratiot County, Bethany Township, 1½ miles gravel road, reward	750 00
	Paid Oct. 20, 1908 and Nov. 30, 1908.	
415.	Branch County, Coldwater Township, 1½ miles gravel road, reward	750 00
	Completed.	
416.	Benzie County, Inland Township, 1¼ miles gravel road, reward	625 00
	Completed.	
417.	Mecosta County, Hinton Township, 1 mile gravel road, reward	500 00
	Completed.	
418.	Menominee County, 1.296 miles gravel road, reward.....	648 00
	Paid Sept. 21, 1908.	
419.	Calhoun County, Leroy Township, 2 miles gravel road, reward	1,000 00

420.	Gratiot County, Pine River Township, 3.472 miles gravel road, reward	\$1,736 00
421.	Mason County, Grant Township, 1 mile gravel road, reward	500 00
	Paid Nov. 2, 1908.	
422.	Menominee County, .232 mile gravel road, reward.....	116 00
	Paid Sept. 21, 1908.	
423.	Kalkaska County, ½ mile gravel road, reward.....	250 00
	Paid Sept. 19, 1908.	
424.	Kalkaska County, 1.004 miles gravel road, reward.....	502 00
425.	Manistee County, Bear Lake Township, 1.536 miles gravel road, reward	768 00
426.	Tuscola County, Elkland Township, 2 miles gravel road, reward	1,000 00
427.	Oakland County, Avon Township, 2.59 miles gravel road, reward	1,295 00
428.	Menominee County, .327 mile macadam road, reward....	327 00
	Paid Aug. 29, 1908.	
429.	Wayne County, 1.256 miles macadam road, reward....	1,256 00
430.	Hillsdale County, Camden Township, .504 mile gravel road, reward	252 00
431.	Hillsdale County, Camden Township, .504 mile gravel road, reward	252 00
432.	Isabella County, Lincoln Township, 1 mile gravel road, reward	500 00
433.	Presque Isle County, Posen Township, 1.002 miles gravel road, reward	501 00
434.	Van Buren County, South Haven Township, ½ mile macadam road, reward	500 00
435.	Van Buren County, South Haven Township, ½ mile macadam road, reward	500 00
436.	Benzie County, Weldon Township, 1 mile gravel road, reward	500 00
437.	Wayne County, .379 mile macadam road, reward.....	379 00
	Application rejected.	
438.	Marquette County, 1.087 miles macadam road, reward..	1,087 00
	\$473 paid Oct. 27, 1908.	
439.	Mason County, 1.48 miles gravel road, reward.....	740 00
	\$250 paid Oct. 10, 1908.	
440.	Oceana County, Pentwater Township, 1 mile macadam road, reward	1,000 00
441.	Gratiot County, North Star Township, 1 mile gravel road, reward	500 00
442.	Gratiot County, North Star Township, 1 mile gravel road, reward	500 00
443.	Eaton County, Hamlin Township, ½ mile gravel road, reward	250 00
	Partly completed.	
444.	Muskegon County, 2 miles macadam road, reward..	2,000 00
	Paid Oct. 16, 1908.	

445.	Barry County, Carlton Township, 1 mile gravel road, reward	\$500 00
	Building.	
446.	Barry County, Carlton Township, 1.022 miles gravel road, reward	511 00
	Building.	
447.	Muskegon County, 1.502 miles gravel road, reward....	751 00
448.	Oceana County, Benona Township, 2.033 miles macadam road, reward	2,033 00
449.	Cheboygan County, .307 mile macadam road, reward..	307 00
	Paid Nov. 17, 1908.	
450.	Dickinson County, ¼ mile macadam road, reward.....	250 00
451.	Gratiot County, Bethany Township, .496 mile gravel road, reward	248 00
	Paid Nov. 30, 1908.	
452.	Iosco County, .152 mile macadam road, reward.....	152 00
453.	Eaton County, Hamlin Township, ½ mile gravel road, reward	250 00
	Partly completed.	
454.	Manistee County, .22 mile macadam road and .662 mile gravel road, reward	551 00
455.	Gratiot County, Emerson Township, 1 mile gravel road, reward	500 00
456.	Gratiot County, Emerson Township, 1 mile gravel road, reward	500 00
457.	St. Clair County, East China Township, 2.224 miles gravel road, reward	1,112 00
458.	Oceana County, Weare Township, 2 miles macadam road, reward	2,000 00
459.	Osceola County, Evart Township, 1.23 miles gravel road, reward	615 00
460.	Tuscola County, Novesta Township, 1 mile gravel road, reward	500 00
461.	Gratiot County, Bethany Township, .496 mile gravel road, reward	248 00
	Paid Nov. 30, 1908.	
462.	Cheboygan County, 1½ miles "C" road, reward.....	1,125 00
463.	Eaton County, Eaton Township, 1 mile gravel road, reward	500 00
	Paid Nov. 30, 1908.	
464.	Benzie County, Weldon Township, 1 mile gravel road, reward	500 00
465.	Montcalm County, Douglass and Sidney Townships, 2½ miles gravel road, reward	1,250 00
	Paid Nov. 30, 1908.	
466.	Gratiot County, Pine River Township, 1 mile gravel road, reward	500 00
467.	Roscommon County, Higgins Township, .964 mile gravel road, reward	482 00

468.	Roscommon County, Higgins Township, .858 mile gravel road, reward	\$429 00
469.	Roscommon County, Higgins Township, .876 mile gravel road, reward	438 00
470.	Manistee County, .984 mile gravel road, reward.....	492 00
471.	Manistee County, 1 mile gravel road, reward.....	500 00
472.	Manistee County, 1.144 miles gravel road, reward	572 00

Total amount applied for	\$408,643 00
Total amount applications rejected	2,379 00
Total amount applications cancelled	28,263 00
Total amount paid	228,215 00
Total amount pending	149,786 00

APPLICATIONS.

NUMBER OF MILES APPLIED FOR.

Class "A" 2.556	Class "B" 294.032	Class "C" 10.390	Class "D" 4.402	Class "E" 250.901	Total 562.281
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NUMBER OF MILES BUILT.

Class "A" 1	Class "B" 140.940	Class "C" 3.631	Class "D" 2.511	Class "E" 153.266	Total 301.348
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NUMBER OF MILES APPLIED FOR AND LATER CANCELLED.

Class "A" 1.056	Class "B" 24.446	Class "C" 5	Class "D" 0	Class "E" 12.026	Total 42.528
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NUMBER OF MILES APPLIED FOR AND APPLICATIONS REJECTED BY DEPARTMENT.

Class "A" 0	Class "B" 1.500	Class "C" 0	Class "D" 0	Class "E" 1.629	Total 3.129
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NUMBER OF MILES PENDING.

Class "A" .500	Class "B" 127.146	Class "C" 1.759	Class "D" 1.891	Class "E" 83.980	Total 215.276
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Forty-foot span, arched, reinforced concrete bridge, built by Exeter township, Monroe county.
Cost \$1,030.



Eighty-foot span, arched, reinforced concrete bridge, built by Exeter township, Monroe county.
Cost \$2,050.

COST OF ROADS.

ALLEGAN COUNTY.

Wayland Township, Application No. 407.

Built by township, "C," 1 mile, width of metal 9 feet.

Engineering expenses, including cost of survey and profile.....	\$21 29
Grading.....	882 36
Labor, including hauling (average length of haul, 1 1/4 miles).....	1,291 33
Crushed gravel used, 1,915 1/2 cubic yards at 6c per cubic yard.....	114 92
Rolling, including sprinkling.....	103 50
Tile.....	36 25
Repair on tools.....	22 25

Total cost.....	\$2,471 90
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State reward.....	750 00
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Cost to township.....	\$1,721 90
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ANTRIM COUNTY.

Elk Rapids Township, Application No. 200.

Built by township, gravel, 1.004 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$28 80
Grading.....	186 47
Labor, including hauling (average length of haul, 2 miles).....	1,203 66
647 cubic yards gravel purchased at 9 3-5c per cubic yard, balance of gravel owned by township.....	62 11
Rolling, including sprinkling.....	80 50
Other expenses.....	29 27

Total cost.....	\$1,590 81
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State reward.....	502 00
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Cost to township.....	\$1,088 81
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Elk Rapids Township, Application No. 355.

Built by township, "D," .955 mile, width of metal 9 feet.

Engineering expenses, including cost of survey and profile.....	\$24 75
Grading.....	163 50
Labor, including hauling (average length of haul 1 1/4 miles).....	985 10
700 cubic yards gravel used at 8c per cubic yard, 635 cubic yards stone used at \$1.00 per cubic yard.....	691 00
Rolling, including sprinkling.....	151 00
Other expenses.....	157 29

Total cost.....	\$2,172 64
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State reward.....	716 00
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Cost to the township.....	\$1,456 64
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Mancelona Township, Application No. 91.

Built prior to December 1st, 1906, by township, 2 miles, gravel.

Cost to township.....	\$2,058 91
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Mancelona Township, Application No. 91.

Built by township, gravel, 2.166 miles, width of gravel 10 feet.

Engineering expenses, including cost of survey and profile.....	\$30 75
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Grading.....	470 87
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Labor, including hauling (average length of haul, 1 $\frac{1}{2}$ miles).....	5,024 19
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Gravel, 4,578 cubic yards, 766 cubic yards at 10c per yard, balance at 4c per cubic yard.....	229 08
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Rolling, including sprinkling.....	162 50
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Total cost.....	\$5,917 39
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State reward.....	1,083 00
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Cost to township.....	\$4,834 39
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Mancelona Township, Application No. 186.

Built by township, gravel, 2 miles, width of gravel 10 feet.

Engineering expenses, including cost of survey and profile.....	\$28 60
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Grading.....	714 97
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Labor, including hauling (average length of haul, 1 mile).....	2,884 88
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Gravel, 3,000 cubic yards.....	84 00
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Rolling, including sprinkling.....	84 00
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Total cost.....	\$3,712 45
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State reward.....	1,000 00
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Cost to township.....	\$2,712 45
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Mancelona Township, Application No. 334.

Built by township, gravel, $\frac{1}{2}$ mile, width of gravel 10 feet.

Engineering expenses, including cost of survey and profile.....	\$7 15
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Grading.....	115 57
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Labor, including hauling (average length of haul, $\frac{1}{2}$ mile).....	681 93
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Gravel, 781 cubic yards, some at 20c and some at 15c per cubic yard..	148 55
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Rolling, including sprinkling.....	21 87
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Total cost.....	\$975 07
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State reward.....	250 00
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Cost to township.....	\$725 07
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Star Township, Application No. 389.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$10 00
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Grading and stumping.....	435 50
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Labor, including hauling (average length of haul, $\frac{1}{2}$ mile).....	1,084 14
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Rolling, including sprinkling.....	25 00
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Total cost.....	\$1,554 64
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State reward.....	500 00
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Cost to township.....	\$1,054 64
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BARRY COUNTY.

Rutland township, Application No. 9.

Built prior to December 1st, 1906, by subscription, 1 mile, gravel.

Cost over and above amount of state reward.....	\$660 00
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Rutland Township, Application No. 112.

Built by township, gravel, 1.05 miles, width of gravel 9½ feet.

Engineering expenses, including cost of survey and profile.....	\$8 00
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Graded by statute labor.

Labor, including hauling (average length of haul, ½ mile).....	902 00
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Gravel, paid \$25 for pit and \$50 for filling hole from which gravel was taken, 2,100 cubic yards used.....

75 00

Rolling, including sprinkling.....

50 00

Culvert.....

35 00

Tile.....

5 00

Total cost (to this should be added 58 days grading by pathmasters)	\$1,075 00
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State reward.....	525 00
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Cost to township (not counting grading).....	\$550 00
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Rutland Township, Application No. 214.

Built by township, gravel, .796 mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$6 00
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Labor, including grading and hauling.....	768 00
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Gravel, about 1,050 cubic yards, all donated but.....	25 00
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Rolling, including sprinkling.....	50 00
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Tile.....	20 00
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Total cost.....	\$869 00
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State reward.....	398 00
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Cost to township.....	\$471 00
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Rutland Township, Application No. 238.

Built by township, gravel, 1.511 miles, width of gravel 10 feet.

Engineering expenses, including cost of survey and profile.....	\$8 00
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Grading.....	75 00
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Labor, including hauling (average length of haul, 1 mile).....	385 50
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Gravel, 850 cubic yards, contributed.

Drain.....	30 00
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Total cost.....	\$498 50
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State reward.....	255 00
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Cost to township.....	\$243 50
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If gravel had been paid for it would add \$85 to the cost.

BAY COUNTY.

Bangor and Monitor Townships, Application No. 160.

Built by county, macadam, 2 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$57 50
Grading.....	180 00
Labor, including hauling (average length of haul, 2½ miles).....	1,938 67
Stone, 2,416 cubic yards at \$1.45 per cubic yard, screenings, 431 cubic yards at \$1.20 per cubic yard.....	4,020 40
Rolling, including sprinkling.....	310 00
Total cost.....	\$6,506 57
State reward.....	2,000 00
Cost to county.....	\$4,506 57

Bangor Township, Application No. 234.

Built by county, macadam, ¾ mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$18 50
Grading.....	302 00
Labor, including hauling (average length of haul, ¾ mile).....	509 88
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 900.7 cubic yards stone, 146.7 cubic yards screenings.....	1,489 39
Rolling, including sprinkling.....	93 25
Total cost.....	\$2,413 02
State reward.....	750 00
Cost to county.....	\$1,663 02

Bangor Township, Application No. 343.

Built by county, macadam, ½ mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$22 50
Grading.....	244 69
Labor, including hauling (average length of haul, 1 mile).....	180 00
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 571 cubic yards stone, 205 cubic yards screenings.....	1,084 20
Rolling, including sprinkling.....	90 00
Total cost.....	\$1,621 39
State reward.....	500 00
Cost to county.....	\$1,121 39

Beaver, Hampton, Kawkawlin, Monitor and Williams Townships, Application No. 10

Built prior to December 1st, 1906, by county, 1½ miles, macadam.	
Cost to county.....	\$5,254 75

Beaver Township, Application No. 45.

Built prior to December 1st, 1906, by county, 2 miles, macadam.	
Cost to county.....	\$7,945 00

Frankenlust and Monitor Townships, Application No. 137.

Built by county, macadam, .401 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$28 00
Grading.....	233 62
Labor, including hauling (average length of haul, $\frac{1}{2}$ mile).....	238 93
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 421.6 cubic yards stone, 128.8 cubic yards screenings.....	772 32
Rolling, including sprinkling.....	114 00
Total cost.....	\$1,386 87
State reward.....	401 00
Cost to county.....	\$985 87

Frankenlust Township, Application No. 323.

Built by county, macadam, 1 mile, width of macadam 9 feet.	
Built by contract, contract price (S. W. Burton, Kawkawlin, contractor)	\$1,289 75
Engineering expenses, including cost of survey and profile.....	65 10
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 1,078 cubic yards stone, 368 cubic yards screenings.....	2,023 10
Rolling, including sprinkling.....	263 75
Total cost.....	\$3,641 70
State reward.....	1,000 00
Cost to county.....	\$2,641 70

Fraser Township, Application No. 135.

Built by county, macadam, 1.565 miles, width of macadam 9 feet.	
Built by contract, contract price includes grading, hauling, spreading stone, and ditching (Ed. Laracey, S. W. Burton, Fred Paige, Kawkawlin, contractors).....	\$1,410 00
Engineering expenses, including cost of survey and profile.....	95 25
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 1,422.2 cubic yards stone, 396 cubic yards screenings.....	2,557 19
Rolling, including sprinkling.....	320 00
Culverts.....	138 20
Total cost.....	\$4,520 64
State reward.....	1,565 00
Cost to county.....	\$2,955 64

Hampton Township, Application No. 138.

Built prior to December 1st, 1906, by county, $\frac{1}{2}$ mile, macadam.	
Cost to county.....	\$1,320 50

Kawkawlin Township, Application No. 322.

Built by county, macadam, 1 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$51 35
Grading.....	120 00
Labor, including hauling (average length of haul, $\frac{1}{2}$ mile).....	474 75
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 1,050 cubic yards stone, 354 cubic yards screenings.....	1,965 00
Rolling, including sprinkling.....	342 37
Total cost.....	\$2,953 47
State reward.....	1,000 00
Cost to county.....	\$1,953 47

Monitor Township, Application No. 342.

Built by county, macadam, $\frac{1}{4}$ mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$43 00
Grading.....	140 00
Labor, including hauling (average length of haul, 2 miles).....	283 04
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 255 cubic yards stone, 96 cubic yards screenings.....	489 75
Rolling, including sprinkling.....	120 00
Total cost.....	\$1,075 79
State reward.....	250 00
Cost to county.....	\$825 79

Pinconning Township, Application No. 233.

Built by county, macadam, .274 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$16 23
Grading.....	183 72
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	517 18
Stone, \$1.25 per cubic yard, screenings, \$1.20 per cubic yard, 503 cubic yards stone, 223 cubic yards screenings.....	896 35
Rolling, including sprinkling.....	138 89
Culverts and drains.....	83 39
Total cost.....	\$1,835 76
State reward.....	274 00
Cost to county.....	\$1,561 76

Pinconning Township, Application No. 279.

Built by county, macadam, .229 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$12 98
Grading.....	146 98
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	413 75
Stone, \$1.25 per cubic yard, screenings, \$1.20 per cubic yard, 403 cubic yards stone, 178 cubic yards screenings.....	717 35
Rolling, including sprinkling.....	111 11
Culverts and drains.....	66 71
Total cost.....	\$1,468 88
State reward.....	229 00
Cost to county.....	\$1,239 88

Pinconning Township, Application No. 341.

Built by county, macadam, .798 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$48 00
Grading.....	430 00
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	1,290 00
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 945 cubic yards stone, 401 cubic yards screenings.....	1,871 50
Rolling, including sprinkling.....	232 00
Total cost.....	\$3,871 50
State reward.....	798 00
Cost to county.....	\$3,073 50

Portsmouth Township, Application No. 136.

Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 feet.	
Built by contract, contract price for draining, hauling and spreading stone (Ed. Laracey, Kawkawlin, contractor).....	\$785 00
Engineering expenses, including cost of survey and profile.....	77 00
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 750 cubic yards stone, 142.5 cubic yards screenings.....	1,265 63
Rolling, including sprinkling.....	136 76
Total cost.....	\$2,264 39
State reward.....	500 00
Cost to county.....	\$1,764 39

Portsmouth Township, Application No. 324.

Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$34 00
Grading.....	300 00
Labor, including hauling (average length of haul, 4 miles).....	617 86
Stone, \$1.45 per cubic yard, screenings, \$1.25 per cubic yard, 645 cubic yards stone, 250 cubic yards screenings.....	1,436 50
Rolling, including sprinkling.....	240 00
Total cost.....	\$2,628 36
State reward.....	500 00
Cost to county.....	\$2,128 36

BENZIE COUNTY.

Benzonia Township, Application No. 166.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$28 00
Built by day labor by township highway commissioner, 1,393 days, at \$1.00 per day, estimated.....	1,393 00
Total cost.....	\$1,421 00
State reward.....	502 00
Cost to township.....	\$919 00

Gilmore Township, Application No. 337.

Built by township, gravel, .438 mile, width of gravel 9 feet.	
Built by contract, contract price (Nels and Carl Bye, contractors).....	\$758 06
Engineering expenses, including cost of survey and profile.....	9 00
Total cost.....	\$767 06
State reward.....	219 00
Cost to township.....	\$548 06

STATE HIGHWAY DEPARTMENT

Gilmore Township, Application No. 338.

Built by township, gravel, .562 mile, width of gravel 9 feet.

Built by contract, contract price (Nels and Carl Bye, contractors).....	\$1,010 74
Engineering expenses, including cost of survey and profile.....	12 00

Total cost.....	\$1,022 74
State reward.....	281 00

Cost to township.....	\$741 74
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Homestead Township, Application No. 398.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$40 00
Grading.....	991 50
Labor, including hauling (average length of haul, 1 mile).....	878 00
Gravel, purchased a pit for.....	90 00
Rolling, including sprinkling.....	50 00
Culverts.....	96 42

Total cost.....	\$2,145 92
State reward.....	500 00

Cost to township.....	\$1,645 92
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BERRIEN COUNTY.

Royalton Township, Application No. 96.

Built by township, macadam, 2.91 miles, width of macadam 10 feet.

Built by contract, contract price (August Shultz, Baroda, contractor)...	\$13,711 85
Engineering expenses, including cost of survey and profile.....	48 25
Tile and laying same.....	188 84
Culverts and drains.....	101 84

Total cost.....	\$14,050 78
State reward.....	2,910 00

Cost to township.....	\$11,140 78
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Royalton Township, Application No. 97.

Built by township, macadam, 2.789 miles, width of macadam 10 feet.

Built by contract, contract price (August Shultz, Baroda, contractor)...	\$13,070 15
Engineering expenses, including cost of survey and profile.....	46 25
Grading.....	995 00
Drainage and culverts.....	170 68

Total cost.....	\$14,282 08
State reward.....	2,789 00

Cost to township.....	\$11,493 08
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St. Joseph Township, Application No. 83.

Built prior to December 1st, 1906, by township, .73 mile, macadam.

Cost to township.....	\$2,616 26
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St. Joseph Township, Application No. 84.

Built prior to December 1st, 1906, by township, .757 mile, macadam.

Cost to township..... \$2,616 74

St. Joseph Township, Application No. 84.

Built by township, macadam, .208 mile, width of macadam 12 feet.

Built by contract, contract price (C. H. Defrees, South Bend, Ind., contractor)..... \$923 58

Engineering expenses, including cost of survey and profile..... 5 00

Grading..... 55 00

Total cost..... \$983 58

State reward..... 213 00

Cost to township..... \$770 58

St. Joseph Township, Application No. 85.

Built prior to December 1st, 1906, by township, 1.049 miles, macadam.

Cost to township..... \$4,722 99

St. Joseph Township, Application No. 86.

Built prior to December 1st, 1906, by township, 1.106 miles, macadam.

Cost to township..... \$4,755 36

St. Joseph Township, Application No. 86.

Built by township, macadam, .498 mile, width of macadam 14 feet.

Built by contract, contract price (C. H. Defrees, South Bend, Ind, contractor)..... \$2,288 00

Engineering expenses, including cost of survey and profile..... 8 00

Grading..... 132 00

Removing oak tree..... 5 25

Total cost..... \$2,433 25

State reward..... 494 00

Cost to township..... \$1,939 25

St. Joseph Township, Application No. 87.

Built by township, macadam, $\frac{1}{4}$ mile, width of macadam 10 feet.

Built by contract, contract price (C. H. Defrees, South Bend, Ind., contractor)..... \$2,772 00

Engineering expenses, including cost of survey and profile..... 25 00

Grading..... 508 98

Concrete arch culvert..... 472 85

Total cost..... \$3,778 83

State reward..... 502 00

Cost to township..... \$3,276 83

St. Joseph Township, Application No. 88.

Built prior to December 1st, 1906, by township, .322 mile, macadam.

Cost to township..... \$1,107 02

STATE HIGHWAY DEPARTMENT

St. Joseph Township, Application No. 89.

Built prior to December 1st, 1906, by township, 1.212 miles, macadam.

Cost to township.....	\$4,020 85
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St. Joseph Township, Application No. 165.

Built by township, macadam, .642 mile, width of macadam 9 feet.

Built by contract, contract price (C. H. Defrees, South Bend, Ind., contractor).....

	\$1,896 00
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Engineering expenses, including cost of survey and profile.....	8 10
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Culvert.....	10 00
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Total cost.....	\$1,914 10
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State reward.....	642 00
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Cost to township.....	\$1,272 10
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St. Joseph Township, Application No. 246.

Built by township, macadam, $\frac{1}{4}$ mile, width of macadam 10 feet.

Built by contract, contract price (C. H. Defrees, South Bend, Ind., contractor).....

	\$924 00
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Engineering expenses, including cost of survey and profile.....	8 00
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Grading.....	169 66
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Total cost.....	\$1,101 66
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State reward.....	125 00
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Cost to township.....	\$976 66
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CALHOUN COUNTY.

Battle Creek Township, Application No. 299.

Built by township, gravel, 1.742 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$10 00
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Grading.....	200 00
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Labor, including hauling (average length of haul $1\frac{1}{4}$ miles).....	1,250 00
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Gravel, donated.....	
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Rolling, including sprinkling.....	25 00
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Total cost.....	\$1,485 00
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State reward.....	871 00
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Cost to township.....	\$614 00
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Emmett Township, Application No. 215.

Built by township, gravel, 1.596 miles, width of gravel 9 feet.

Built by contract, contract price (Mitchell Bros., Battle Creek, contractors).....

	\$3,330 00
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Engineering expenses, including cost of survey and profile.....	12 50
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Bridges.....	572 00
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Tile.....	37 00
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Fencing.....	122 04
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Right of way.....	100 00
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Total cost.....	\$4,173 54
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State reward.....	798 00
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Cost to township.....	\$3,375 54
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State reward gravel road in Arcada township, Gratiot county.



State reward gravel road in Pine River township, Gratiot county.

A dry season and a tremendous sugar beet traffic have slightly rutted these roads, but a road drag will quickly put them in shape again.



Newton Township, Application No. 353.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Built by contract, contract price (Thomas Mitchell, Battle Creek, R. D. 2, contractor).....	\$900 00
Engineering expenses, including cost of survey and profile.....	25 75
Culverts.....	62 70
Total cost.....	\$988 45
State reward.....	500 00
Cost to township.....	\$488 45

CHEBOYGAN COUNTY.

Benton Township, Application No. 44.

Built prior to December 1st, 1906, by county, 1½ miles "C."	
Cost to county.....	\$3,715 00

Benton Township, Application No. 44.

Built by county, "C," .019 mile, width of metal 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$3 00
Grading.....	15 00
Labor, including hauling (average length of haul, 1½ miles).....	100 10
Rolling, including sprinkling.....	20 00
Total cost.....	\$138 10
State reward.....	14 00
Cost to county.....	\$124 10

Benton Township, Application No. 157.

Built by county, "C" and "E," 2.556 miles, width of metal 9 feet.	
Engineering expenses.....	\$32 00
Grading.....	1,138 28
Labor, including hauling (average length of haul, 1½ miles).....	3,781 28
Gravel and stone, partly contributed.....	572 18
Culverts.....	141 14
Coal and oil.....	266 31
Gravel elevator.....	250 00
Repairs to crusher and elevator.....	302 33
Total cost.....	\$6,483 52
State reward.....	2,301 00
Cost to county.....	\$4,182 52

Benton Township, Application No. 235.

Built by county, "C," .068 mile, width of metal 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$5 00
Grading.....	35 00
Labor, including hauling (average length of haul, 1½ miles).....	232 12
Rolling, including sprinkling.....	55 00
Total cost.....	\$327 12
State reward.....	68 00
Cost to county.....	\$259 12

STATE HIGHWAY DEPARTMENT

Benton Township, Application No. 449.

Built by county, macadam, .307 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$6 00
Grading.....	15 00
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	591 98
Stone, partly donated.....	18 89
Repairs and oil.....	114 39
Coal.....	36 16
Culverts.....	16 80
Total cost.....	\$799 22
State reward.....	307 00
Cost to county.....	\$492 22

CLARE COUNTY.

Grant Township, Application No. 118.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Built by contract, contract price (Taylor & Geeck, Owosso, contractors)	\$1,390 00
Engineering expenses, including cost of survey and profile.....	32 00
Gravel, 1,450 cubic yards at 10c per cubic yard.....	145 00
Other expenses.....	83 00
Total cost.....	\$1,650 00
State reward.....	500 00
Cost to township.....	\$1,150 00

Grant Township, Application No. 357.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Built by contract, contract price (Thomas McGivern and Fred Hess, Clare, contractors).....	\$1,300 00
Engineering expenses, including cost of survey and profile.....	23 00
Gravel, 1,500 cubic yards at 8c per yard.....	120 00
Culverts.....	65 00
Widening fill.....	27 00
Total cost.....	\$1,535 00
State reward.....	500 00
Cost to township.....	\$1,035 00

DELTA COUNTY.

Bark River Township, Application No. 134.

Built by county, macadam, 2 miles, width of macadam 16 feet.	
Built by contract, contract price for macadam (John McLaughlin, Escanaba, contractor).....	\$5,940 00
Engineering expenses, including cost of survey and profile.....	190 00
Grading.....	1,200 00
Bridge.....	634 20
Total cost.....	\$7,964 20
State reward.....	2,000 00
Cost to county.....	\$5,964 20

Ford River Township, Application No. 52.

Built prior to December 1st, 1906, by county, 1½ miles, macadam.

Cost to county..... \$5,283 96

Wells Township, Application No. 53.

Built prior to December 1st, 1906, by county, ½ mile, macadam.

Cost to county..... \$2,389 59

DICKINSON COUNTY.

Breitung Township, Application No. 4.

Built prior to December 1st, 1906, by county, 1.026 miles, macadam.

Cost to county..... \$3,696 55

Breitung Township, Application No. 20.

Built prior to December 1st, 1906, by county, 1.022 miles, macadam.

Cost to county..... \$4,439 07

Breitung Township, Application No. 114.

Built by county prior to December 1st, 1906, 2.41 miles, macadam.

Cost to county..... \$11,540 18

Breitung Township, Application No. 371.

Built by county, macadam, 2.441 miles, width of macadam 9 feet.

Built by contract, contract price (Hoose and Person, Iron Mountain, contractors)..... \$7,630 29

Engineering expenses, including cost of survey and profile..... 561 68

Grading..... 5,405 45

Culverts..... 950 00

Culvert pipe..... 150 00

Total cost..... \$14,697 42

State reward..... 2,441 00

Cost to county..... \$12,256 42

Norway Township, Application No. 220.

Built by county, macadam, 1.026 miles, width of macadam 15 feet.

Built by contract, contract price (J. E. Blomgren, Norway, contractor). \$2,980 99

Grading..... 1,370 00

Guard rail..... 264 80

Culvert pipe..... 380 25

Extras..... 141 38

Total cost..... \$5,137 42

State reward..... 1,026 00

Cost to county..... \$4,111 42

EATON COUNTY.

Eaton Township, Application No. 463.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$15 00
Grading.....	40 00
Labor, including hauling (average length of haul, 1 mile).....	730 67
Gravel, 2,050 cubic yards at 12½¢ per yard.....	256 25
Rolling, including sprinkling.....	50 00
Total cost.....	\$1,091 92
State reward.....	500 00
Cost to township.....	\$591 92

Eaton Rapids Township, Application No. 90.

Built by township, gravel, 1.074 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	50 00
Gravel, 1,700 cubic yards at 10¢ per cubic yard.....	170 00
Labor, including hauling (average length of haul, ¾ mile).....	871 00
Culverts.....	35 00
Total cost.....	\$1,150 00
State reward.....	537 00
Cost to township.....	\$613 00

Eaton Rapids Township, Application No. 188.

Built by township, gravel, ¾ mile, width of gravel 9 feet.	
Built by contract, contract price (Claude Marshall, Eaton Rapids, contractor).....	\$500 00
Engineering expenses, including cost of survey and profile.....	7 00
Gravel, 750 cubic yards at 10¢ per cubic yard.....	75 00
Total cost.....	\$582 00
State reward.....	250 00
Cost to township.....	\$332 00

Eaton Rapids Township, Application No. 189.

Built by township, gravel, ¾ mile, width of gravel 9 feet.	
Built by contract, contract price (Claude Marshall, Eaton Rapids, contractor).....	\$490 00
Engineering expenses, including cost of survey and profile.....	10 00
Gravel.....	75 00
Total cost.....	\$575 00
State reward.....	250 00
Cost to township.....	\$325 00

Eaton Rapids Township, Application No. 190.

Built by township, gravel, .524 mile, width of gravel 9 feet.

Built by contract, contract price (Claude Marshall, Eaton Rapids, contractor).....

\$700 00

Engineering expenses.....

7 00

Culverts.....

36 00

Hauling and placing culverts.....

19 00

Inspection.....

10 00

Total cost.....

\$772 00

State reward.....

262 00

Cost to township.....

\$510 00

Hamlin Township, Application No. 14.

Built prior to December 1st, 1906, by township, 1 mile, gravel.

Cost to township.....

\$338 35

Hamlin Township, Application No. 207.

Built by township, gravel, $\frac{1}{4}$ mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile, estimated...

\$5 00

Grading.....

21 37

Labor, including hauling (average length of haul, 2 miles).....

381 22

Gravel, 938 cubic yards at 10c per cubic yard.....

93 80

Rolling, including sprinkling.....

13 50

Total cost.....

\$514 89

State reward.....

250 00

Cost to township.....

\$264 89

Hamlin Township, Application No. 208.

Built by township, gravel, $\frac{1}{4}$ mile, width of gravel, 9 feet.

Engineering expenses, including cost of survey and profile, estimated..

\$5 00

Grading.....

21 37

Labor, including hauling (average length of haul, 2 miles).....

381 23

Gravel, 937 cubic yards at 10c per cubic yard.....

93 70

Rolling, including sprinkling.....

13 50

Total cost.....

\$514 80

State reward.....

250 00

Cost to township.....

\$264 80

GRAND TRAVERSE COUNTY.

Whitewater Township, Application No. 406.

Built by township, gravel, 1.08 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....

\$46 49

Grading.....

453 83

Labor, including hauling (average length of haul, 1 mile).....

679 68

Gravel, nearly 1,626 cubic yards at 6c per cubic yard.....

97 44

Rolling, including sprinkling.....

12 00

Drains.....

36 54

Culvert.....

14 00

Total cost.....

\$1,339 98

State reward.....

540 00

Cost to township.....

\$799 98

STATE HIGHWAY DEPARTMENT

GRATIOT COUNTY.

Arcada Township, Application No. 21.

Built prior to December 1st, 1906, by township, 1 mile, gravel.

Cost to township.....	\$461 50
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Arcada Township, Application No. 104.

Built prior to December 1st, 1906, by township, 1 mile, gravel.

Cost to township.....	\$428 00
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Arcada Township, Application No. 104.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$4 50
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Grading.....	320 00
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Labor, including hauling (average length of haul, 3 miles).....	673 70
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Gravel, 1,413 cubic yards at 10c per cubic yard.....	141 30
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Rolling, including sprinkling.....	12 00
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Total cost.....	\$1,151 50
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State reward.....	500 00
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Cost to township.....	\$651 50
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Arcada Township, Application No. 198.

Built by township, gravel, 1.02 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$5 00
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Grading, estimated.....	300 00
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Gravel.....	115 90
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Labor, including hauling (average length of haul, 2½ miles).....	578 50
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Total cost.....	\$999 40
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State reward.....	510 00
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Cost to township.....	\$489 40
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Arcada Township, Application No. 199.

Built by township, gravel, 1.012 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$6 50
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Grading.....	288 00
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Labor, including hauling (average length of haul, ½ mile).....	275 84
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Gravel, partly taken from highway, partly purchased at 15c and 20c per cubic yard.....	176 85
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Sluice and driveways.....	22 00
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Total cost.....	\$749 19
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State reward.....	506 00
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Cost to township.....	\$243 19
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Bethany Township, Application No. 414.

Built by township, gravel, $1\frac{1}{2}$ miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$17 00
Grading.....	575 01
Labor, including hauling (average length of haul, $4\frac{1}{2}$ miles).....	1,694 16
Gravel, 2,119 $\frac{1}{2}$ cubic yards at 13 $\frac{1}{2}$ c per cubic yard.....	282 60
Rolling, including sprinkling.....	33 00
Bridge.....	85 00
Culvert.....	55 00
Loader and screen.....	46 25
Plough.....	14 00
Repairs to plough and screen.....	4 00

Total cost.....	\$2,806 02
State reward.....	750 00
Cost to township.....	\$2,056 02

Bethany Township, Application No. 451.

Built by township, gravel, $\frac{1}{2}$ mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$6 50
Grading.....	1 33
Labor, including hauling (average length of haul, 2 miles).....	327 00
Gravel, 727 cubic yards at 13 $\frac{1}{2}$ c per cubic yard.....	96 93
Rolling, including sprinkling.....	9 00

Total cost.....	\$572 43
State reward.....	248 00
Cost to township.....	\$324 43

Bethany Township, Application No. 461.

Built by township, gravel, $\frac{1}{2}$ mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$6 50
Grading.....	92 00
Labor, including hauling (average length of haul, $2\frac{1}{2}$ miles).....	368 00
Gravel, 728 cubic yards at 13 $\frac{1}{2}$ c per cubic yard.....	97 07
Rolling, including sprinkling.....	9 00

Total cost.....	\$572 57
State reward.....	248 00
Cost to township.....	\$324 57

Emerson Township, Application No. 110.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Grading.....	\$400 00
Labor, including hauling (average length of haul, 2 miles).....	471 03
Fitting gravel and picking stone.....	75 00

Total cost.....	\$946 03
State reward.....	500 00
Cost to township.....	\$446 03

STATE HIGHWAY DEPARTMENT

Emerson Township, Application No. 251.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Grading.....	\$400 00
Labor, including hauling (average length of haul, 2 miles).....	546 03

Total cost.....	\$946 03
State reward.....	500 00

Cost to township.....	\$446 03
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Pine River Township, Application No. 25.

Built prior to December 1st, 1906, by township, 1 mile, gravel.

Cost to township.....	\$490 25
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Pine River Township, Application No. 63.

Built prior to December 1st, 1906, by township, 1 mile, gravel.

Cost to township.....	\$415 15
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Pine River Township, Application No. 64.

Built prior to December 1st, 1906, by township, 1 mile, gravel.

Cost to township.....	\$613 50
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Pine River Township, Application No. 147.

Built by township, gravel, 2 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$10 00
Grading.....	440 00
Labor, including hauling (average length of haul, $\frac{1}{2}$ mile).....	719 63
Rolling, including sprinkling.....	24 00

Total cost.....	\$1,193 63
State reward.....	1,000 00

Cost to township.....	\$193 63
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Sumner township, Application No. 362.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$11 00
Grading.....	209 00
Labor, including hauling (average length of haul, 1 mile).....	387 17
Gravel.....	40 00
Rolling, including sprinkling.....	9 00

Total cost.....	\$656 17
State reward.....	500 00

Cost to township.....	\$156 17
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HURON COUNTY.

Sand Beach Township, Application No. 156.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$12 50
Grading.....	150 00
Labor, including hauling (average length of haul, 3 $\frac{1}{2}$ miles).....	1,452 90
Gravel, 1,670 cubic yards at 14c per cubic yard.....	233 80
Rolling, including sprinkling.....	100 00
Lengthening bridge.....	16 00
Total cost.....	\$1,965 20
State reward.....	521 00
Cost to township.....	\$1,444 20

Sand Beach Township, Application No. 232.

Built by township, macadam, 1.064 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$40 00
Grading.....	237 65
Labor, including hauling (average length of haul, 1 $\frac{1}{2}$ miles).....	1,158 14
Stone, 1,915 cubic yards at \$1.00 per yard.....	1,915 00
Rolling, including sprinkling.....	105 58
Other expenses.....	647 76
Total cost.....	\$4,104 13
State reward.....	1,064 00
Cost to township.....	\$3,040 13

Sebewaing township, Application No. 358.

Built by township, macadam, 1.045 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$22 90
Grading.....	697 28
Labor, including hauling (average length of haul, 1 $\frac{1}{2}$ miles).....	1,056 48
Stone, 1,714 cubic yards at \$1.358 per cubic yard.....	2,327 26
Rolling, including sprinkling.....	328 98
Total cost.....	\$4,432 90
State reward.....	1,045 00
Cost to township.....	\$3,387 90

Verona Township, Application No. 212.

Built by township, gravel, 1.002 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$25 00
Grading.....	203 05
Labor, including hauling (average length of haul, 1 $\frac{1}{2}$ miles).....	1,109 49
Gravel, 2,520 cubic yards at 4c per cubic yard.....	100 80
Rolling, including sprinkling.....	42 00
Culvert.....	14 15
Total cost.....	\$1,494 49
State reward.....	501 00
Cost to township.....	\$993 49

STATE HIGHWAY DEPARTMENT

Winsor Township, Application No. 245.

Built by township, macadam, 1.013 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$32 86
Grading.....	565 76
Labor, including hauling (average length of haul, $\frac{1}{4}$ miles).....	414 73
Stone, 1,732 cubic yards at 52 $\frac{1}{2}$ c per cubic yard.....	909 30
Rolling, including sprinkling.....	495 03
Stone for abutments on grade.....	32 00
Three concrete culverts.....	80 00
Total cost.....	\$2,529 68
State reward.....	1,013 00
Cost to township.....	\$1,516 68

Winsor Township, Application No. 350.

Built by township, macadam, 1.008 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$36 99
Grading.....	388 80
Labor, including hauling (average length of haul, 1 $\frac{1}{4}$ miles).....	647 96
Stone, 1,716 cubic yards at about 66c per cubic yard.....	1,137 45
Rolling, including sprinkling.....	397 37
Culvert.....	22 00
Total cost.....	\$2,630 57
State reward.....	1,008 00
Cost to township.....	\$1,622 57

Winsor Township, Application No. 351.

Built by township, macadam, 1 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$36 99
Grading.....	412 20
Labor, including hauling (average length of haul, 1 mile).....	660 21
Stone, 2,115 cubic yards at about 60c per cubic yard.....	1,278 74
Rolling, including sprinkling.....	435 80
Concrete culvert.....	25 00
Total cost.....	\$2,848 94
State reward.....	1,000 00
Cost to township.....	\$1,848 94

INGHAM COUNTY.

Lansing Township, Application No. 27.

Built prior to December 1st, 1906, by township, 2 miles, macadam.	
Cost, above state reward.....	\$11,485 17



State reward gravel road in Henrietta township, Jackson county. Over 20,000 cubic yards of earth were moved to make the fill across the swamp shown in the distance. The road was utterly impassable in spring and fall but is now a country boulevard.



State reward gravel road in Mancelona township, Antrim county. The gravel used in this road was over ninety per cent pebbles that would stay above a one-eighth mesh screen. It packed slowly but today is smooth as glass and hard as a rock.

Lansing Township, Application No. 379.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$25 70	
Grading.....	237 86	3 90
Labor, including hauling (average length of haul, 2 miles).....	1,202 60	3 93
Gravel, donated, 1,718 cubic yards.....		7 40
Rolling, including sprinkling.....	56 70	7 76
Concrete bridge.....	165 00	9 91
Concrete culvert.....	34 00	4 54
Tile drains and catch basins.....	18 34	4 80

Total cost.....	\$1,740 20	2 24
State reward.....	500 00	0 00

Cost to township.....	\$1,240 20	2 24
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Meridian Township, Application No. 376.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Engineering expense, including cost of survey and profile.....	\$15 00	
Grading.....	300 00	
Labor, including hauling (average length of haul, 1½ miles).....	1,450 15	
Gravel, 1,512 cubic yards at 10c per cubic yard.....	151 20	
Rolling, including sprinkling, roller donated by M. A. C.....	14 63	0 23
Culvert pipe.....	50 00	
Tile.....	45 00	

Total cost.....	\$2,025 94	
State reward.....	500 00	

Cost to township.....	\$1,525 94	0 08
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IOSCO COUNTY.

Grant and Reno Townships, Application No. 123.

Built prior to December 1st, 1906, by county, 1.023 miles, macadam.

Cost to county.....	\$2,115 42	00
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Grant and Reno Townships, Application No. 123.

Built by county, macadam, 1.405 miles, width of macadam, 9 feet.

Engineering expenses, including cost of survey and profile.....	\$14 00	00
Grading.....	1,225 00	50
Labor, including hauling (average length of haul, 83-100 miles).....	1,425 00	40
Stone, 2,205 cubic yards at \$1.20 per cubic yard.....	2,646 00	00
Other expenses.....	40 00	00

Total cost.....	\$5,340 00	00
State reward.....	1,425 00	05

Cost to county.....	\$3,915 00	51
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Lansing Township, Application No. 379.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$25 70
Grading.....	237 86
Labor, including hauling (average length of haul, 2 miles).....	1,202 60
Gravel, donated, 1,718 cubic yards.	
Rolling, including sprinkling.....	56 70
Concrete bridge.....	165 00
Concrete culvert.....	34 00
Tile drains and catch basins.....	18 34
Total cost.....	\$1,740 20
State reward.....	500 00
Cost to township.....	\$1,240 20

Meridian Township, Application No. 376.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expense, including cost of survey and profile.....	\$15 00
Grading.....	300 00
Labor, including hauling (average length of haul, 1 1/2 miles).....	1,450 15
Gravel, 1,512 cubic yards at 10c per cubic yard.....	151 20
Rolling, including sprinkling, roller donated by M. A. C.....	14 63
Culvert pipe.....	50 00
Tile.....	48 00
Total cost.....	\$2,028 98
State reward.....	500 00
Cost to township.....	\$1,528 98

IOSCO COUNTY.

Grant and Reno Townships, Application No. 123.

Built prior to December 1st, 1906, by county, 1.023 miles, macadam.	
Cost to county.....	\$2,608 43

Grant and Reno Townships, Application No. 123.

Built by county, macadam, 1.405 miles, width of macadam, 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$14 00
Grading.....	1,225 00
Labor, including hauling (average length of haul, 83-100 mile).....	1,420 00
Stone, 2,208 cubic yards at \$1.20 per cubic yard.....	2,649 20
Other expenses.....	40 00
Total cost.....	\$5,348 60
State reward.....	1,405 00
Cost to county.....	\$3,943 60

ISABELLA COUNTY.

Coe Township, Application No. 222.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$34 00
Grading.....	300 00
Labor, including hauling (average length of haul, 3½ miles).....	1,029 70
Gravel, 1,487 cubic yards at 10c per cubic yard.....	148 70
Rolling, including sprinkling.....	10 00
Culverts, estimated.....	75 00

Total cost.....	\$1,597 40
State reward.....	500 00

Cost to township.....	\$1,097 40
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Coe Township, Application No. 223.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$19 00
Grading.....	300 00
Labor, including hauling (average length of haul, 1½ miles).....	813 00
Gravel, 1,500 cubic yards at 10c per cubic yard.....	150 00
Rolling, including sprinkling.....	16 00
About \$300 worth of work donated.	

Total cost.....	\$1,248 00
State reward.....	500 00

Cost to township.....	\$748 00
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JACKSON COUNTY.

Henrietta Township, Application No. 62.

Built prior to December 1st, 1906, by township, 1 mile, macadam.	
Cost to township.....	\$2,778 53

Henrietta Township, Application No. 191.

Built by township, macadam, 1 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$52 84
Grading.....	669 40
Labor, including crushing and hauling (average length of haul, 1½ miles).....	2,303 57
Rolling, including sprinkling and freight on roller.....	548 80
Culverts and drains.....	138 53
Repairs to crusher.....	293 02
Freight.....	14 38
Oil.....	14 24

Total cost.....	\$4,034 78
State reward.....	1,000 00

Cost to township.....	\$3,034 78
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Henrietta Township, Application No. 192.

Built by township, gravel, 1 mile, width of gravel 12 feet.	
Engineering expenses, including cost of survey and profile.....	\$23 90
Grading, 33,000 cubic yards of fill in 2,200 feet.....	3,563 93
Labor, including hauling (average length of haul, 2 miles).....	1,967 40
Gravel, 2,222 cubic yards at 8c per cubic yard.....	177 76
Rolling, including sprinkling.....	29 91
Bridges and drains.....	644 54
Sodding.....	14 80
Total cost.....	\$6,422 24
State reward.....	500 00
Cost to township.....	\$5,922 24

KALKASKA COUNTY.

Boardman Township, Application No. 12.

Built prior to December 1st, 1906, by county, 1 mile, macadam.	
Cost to county.....	\$3,610 23

Boardman Township, Application No. 57.

Built prior to December 1st, 1906, by county, 1 mile, macadam.	
Cost to county.....	\$3,374 08

Boardman Township, Application No. 163.

Built by county, gravel, 1.156 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$25 00
Grading.....	498 00
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	881 50
Gravel, 1,512 cubic yards at 20c per cubic yard.....	302 40
Rolling, including sprinkling.....	55 00
Tile.....	7 00
Total cost.....	\$1,768 90
State reward.....	578 00
Cost to county.....	\$1,190 90

Clearwater Township, Application No. 164.

Built by county, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$25 00
Grading.....	497 05
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	534 51
Gravel, 1,420 cubic yards at 20c per cubic yard.....	284 00
Rolling, including sprinkling.....	50 00
Plank.....	27 00
Total cost.....	\$1,417 56
State reward.....	500 00
Cost to county.....	\$917 56

Clearwater Township, Application No. 345.

Built by township, gravel, 1.004 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$25 00
Grading.....	257 44
Labor, including hauling.....	1,080 84
Gravel, 1,548 cubic yards at 5c per cubic yard.....	77 40
Rolling, including sprinkling.....	12 50
Sewer pipe culvert.....	12 34
Total cost.....	\$1,465 52
State reward.....	502 00
Cost to township.....	\$962 52

Cold Springs Township, Application No. 266.

Built by county, gravel, 1.008 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$30 00
Grading.....	485 40
Labor, including hauling (average length of haul, 2½ miles).....	1,806 40
Gravel, 8½c per cubic yard.....	100 87
Rolling, including sprinkling.....	50 00
Tile.....	20 00
Total cost.....	\$2,492 67
State reward.....	504 00
Cost to county.....	\$1,988 67

Excelsior Township, Application No. 56.

Built prior to December 1st, 1906, by county, 1 mile "D."	
Cost to county.....	\$2,943 83

Orange Township, Application No. 228.

Built by county, gravel, 1.254 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$35 00
Grading.....	1,014 80
Labor, including hauling (average length of haul, 1½ miles).....	1,823 89
Rolling, including sprinkling.....	60 00
Total cost.....	\$2,933 69
State reward.....	627 00
Cost to county.....	\$2,306 69

Rapid River Township, Application No. 262.

Built by county, 1 mile, gravel, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$17 00
Grading.....	657 45
Labor, including hauling (average length of haul, 1½ mile).....	957 60
Gravel, 1,414 cubic yards at 16c per cubic yard.....	226 24
Rolling, including sprinkling.....	26 50
Total cost.....	\$1,884 79
State reward.....	500 00
Cost to county.....	\$1,384 79

Rapid River Township, Application No. 423.

Built by county, gravel, $\frac{1}{4}$ mile, width of gravel, 9 feet.

Engineering expenses, including cost of survey and profile.....	\$8 00
Grading.....	328 75
Labor, including hauling (average length of haul, $1\frac{1}{4}$ miles).....	478 80
Gravel, 708 cubic yards at 16c per cubic yard.....	113 28
Rolling, including sprinkling.....	13 50

Total cost.....	\$942 33
State reward.....	250 00

Cost to county.....	\$692 33
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Wilson Township, Application No. 58.

Built by county, gravel, 1.004 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$25 00
Grading.....	1,667 87
Labor, including hauling (average length of haul, $1\frac{1}{4}$ miles).....	1,087 99
Gravel, 1,580 cubic yards at 20c per cubic yard.....	316 00
Rolling, including sprinkling.....	50 00
Tile.....	60 00

Total cost.....	\$3,206 86
State reward.....	502 00

Cost to county.....	\$2,704 86
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Wilson Township, Application No. 162.

Built by county, gravel, 1.214 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$30 00
Grading.....	845 87
Labor, including hauling (average length of haul, 1 mile).....	862 85
Gravel, 1,468 cubic yards at 20c per cubic yard.....	293 60
Rolling, including sprinkling.....	40 00
Tile.....	40 00

Total cost.....	\$2,112 32
State reward.....	607 00

Cost to county.....	\$1,505 32
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KENT COUNTY.

Byron Township, Application No. 111.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$5 00
Grading.....	125 00
Labor, including hauling (average length of haul, $3\frac{1}{4}$ miles).....	2,178 86
Gravel, 1,700 cubic yards at 8c per yard.....	136 00
Rolling, including sprinkling.....	50 00

Total cost.....	\$2,494 86
State reward.....	500 00

Cost to township.....	\$1,994 86
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STATE HIGHWAY DEPARTMENT

Grand Rapids Township, Application No. 317.

Built by district, gravel, $\frac{1}{2}$ mile, width of gravel 12 feet.	
Engineering expenses, including cost of survey and profile.....	\$24 87
Grading.....	420 00
Labor, including hauling (average length of haul, $1\frac{1}{2}$ miles).....	890 04
Gravel, 966 cubic yards at 40c per $1\frac{1}{2}$ yards.....	257 52
Rolling, including sprinkling.....	42 00
Culverts.....	82 80
Tile for driveways.....	27 60

Total cost.....	\$1,744 83
State reward.....	250 00

Cost to district.....	\$1,494 83
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Grand Rapids Township, Application No. 346.

Built by district, gravel, $\frac{1}{2}$ mile, width of gravel 22 feet.	
Engineering expenses, including cost of survey and profile.....	\$28 90
Grading.....	130 00
Labor, including hauling (average length of haul, $\frac{1}{2}$ mile).....	519 43
Gravel, 1,694 cubic yards at 40c per $1\frac{1}{2}$ yards.....	451;37
Rolling, including sprinkling.....	65;00
Cleaning roadside.....	35 00
Stripping and storing gravel.....	127;00

Total cost.....	\$1,356 70
State reward.....	250 00

Cost to district.....	\$1,106 70
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Paris Township, Application No. 348.

Built by district, gravel, 1 mile, width of gravel 12 feet.	
Engineering expenses, including cost of survey and profile.....	\$33 00
Grading.....	723 07
Labor, including hauling (average length of haul, 3 miles).....	2,477 25
Hauling and gravel furnished by contract, 1,835 cubic yards gravel delivered at \$1.35 per yard for screened and \$1.25 per yard for bank.	
Rolling, including sprinkling.....	34 75
Superintending.....	306 25
Bridges and culverts.....	439 60

Total cost.....	\$4,013 92
State reward.....	500 00

Cost to district.....	\$3,513 92
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Sparta Township, Application No. 182.

Built by township, gravel, 1.02 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$19 48
Grading.....	384 59
Labor, including hauling (average length of haul, 2 miles).....	1,231 03
Gravel, 1,550 cubic yards at 10c and 15c per cubic yard.....	159 35
Rolling, including dragging.....	48 00
Overseers' wages.....	130 00
Concrete drain.....	8 05
Tube culvert.....	29 97
Concrete culvert.....	64 30
Driveway.....	13 16

Total cost.....	\$2,087 93
State reward.....	510 00

Cost to township.....	\$1,577 93
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Sparta Township, Application No. 183.

Built by township, gravel, .976 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$19 48
Grading.....	292 40
Labor, including hauling (average length of haul, 2 miles).....	1,366 12
Gravel, 1,878 cubic yards at 10c per cubic yard.....	187 80
Rolling, including sprinkling.....	26 00
Concrete culvert.....	52 76
Culverts.....	68 00
Sewer pipes.....	7 76
Concrete work.....	9 50
Repairs.....	1 00
Total cost.....	\$2,030 82
State reward.....	488 00
Cost to township.....	\$1,542 82

Tyrone Township, Application No. 6.

Built prior to December 1st, 1906, by township, 2 miles, gravel.	
Cost to township.....	\$2,150 00

Tyrone Township, Application No. 59.

Built by township, gravel, $\frac{1}{4}$ mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile, estimated...	\$20 00
Grading.....	160 00
Labor, including hauling, estimated.....	476 10
Gravel, 126 cubic yards at 15c per yard.....	123 90
Rolling, including sprinkling.....	20 00
Culverts, estimated.....	100 00
Total cost estimated.....	\$900 00
State reward.....	250 00
Cost to township.....	\$650 00

Tyrone Township, Application No. 60.

Built by township, gravel, 1.004 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	545 00
Labor, including hauling (average length of haul, $1\frac{1}{4}$ miles).....	1,000 00
Gravel, 1,578 cubic yards at 15c per cubic yard.....	236 70
Rolling, including sprinkling.....	24 00
1 concrete arch culvert.....	160 00
1 small arch culvert.....	27 00
Approaches to farms.....	125 00
Other expenses.....	10 00
Total cost.....	\$2,151 70
State reward.....	502 00
Cost to township.....	\$1,649 70

Tyrone Township, Application No. 61.

Built by township, gravel, $\frac{1}{4}$ mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile, estimated...	\$20 00
Grading.....	125 00
Labor, including hauling, estimated.....	474 90
Gravel, 834 cubic yards at 15c per cubic yard.....	125 10
Rolling, including sprinkling.....	20 00
Culverts, estimated.....	100 00
Total cost, estimated.....	\$865 00
State reward.....	250 00
Cost to township.....	\$615 00

Tyrone Township, Application No. 195.

Built by township, gravel, 1.004 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$16 00
Grading.....	185 00
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	760 00
Gravel, 1,582 cubic yards at 15c per cubic yard.....	237 30
Rolling, including sprinkling.....	15 00
Concrete bridge.....	182 00
Two culverts.....	28 00
Approaches to farms.....	48 00
Total cost.....	\$1,471 30
State reward.....	502 00
Cost to membership.....	\$969 30

Tyrone Township, Application No. 196.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Built by contract, contract price (L. W. Clintsman, Casnovia, contractor)	\$600 00
Engineering expenses, including cost of survey and profile.....	15 00
Culvert.....	24 00
Railing.....	30 00
Total cost.....	\$669 00
State reward.....	500 00
Cost to township.....	\$169 00
To this should be added \$500 worth of labor performed by local residents.	

Tyrone Township, Application No. 310.

Built by township, gravel, 1.004 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	280 00
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	882 80
Gravel, 1,510 cubic yards at 15c per cubic yard.....	225 65
Rolling, including sprinkling.....	10 00
Concrete bridge.....	200 00
Culverts.....	27 00
Incidentals.....	9 00
Total cost.....	\$1,659 45
State reward.....	502 00
Cost to township.....	\$1,157 45

Tyrone Township, Application No. 311.

Built by township, gravel, .992 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$26 00
Grading.....	270 00
Labor, including hauling (average length of haul, 3 miles).....	1,780 00
Gravel, 1,558 cubic yards at 15c per cubic yard.....	233 70
Rolling, including sprinkling.....	12 00
Lengthening 4 culverts and building 1.....	58 00
Plough points and plough repairs.....	5 07
Finishing road.....	6 50
Total cost.....	\$2,391 27
State reward.....	496 00
Cost to township.....	\$1,895 27

Walker Township, Application No. 347.

Built by district, gravel, 1½ miles, width of gravel, 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$28 60
Grading.....	425 82
Gravel, 1,884½ cubic yards at \$1.00 per cubic yard delivered.....	1,884 50
Rolling, including sprinkling.....	25 00
Material, tools, tile, posts and rails.....	19 50
Total cost.....	\$2,383 42
State reward paid.....	300 00
Cost to district.....	\$2,083 42

LAKE COUNTY.

Newkirk Township, Application No. 116.

Built prior to December 1st, 1906, by township, 1 mile, gravel.	
Cost to township.....	\$610 84

MACOMB COUNTY.

Warren Township, Application No. 7.

Built prior to December 1st, 1906, by township, 2 miles, macadam.	
Cost to township.....	\$10,178 40

MANISTEE COUNTY.

Arcadia Township, Application No. 282.

Built by county, gravel, ¾ mile, width of gravel 12 feet.	
Engineering expenses, including cost of survey and profile.....	\$15 00
Grading done by contract, contract price.....	1,625 00
Gravel, 1,678 cubic yards at 58c per cubic yard.....	973 24
Rolling, including sprinkling.....	100 00
Tiling.....	25 00
Sodding, 2,250 yards.....	135 00
Total cost.....	\$2,873 24
State reward.....	375 00
Cost to county.....	\$2,498 24

STATE HIGHWAY DEPARTMENT

Negaunee Township, Application No. 241.

Built by county, macadam, .35 mile, width of macadam 14 feet.	
Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	80 70
Labor, including hauling (average length of haul, 1½ miles).....	263 00
Stone, 534 cubic yards at \$1.30 per cubic yard.....	694 20
Rolling, including sprinkling.....	181 50
Camp building, maintenance, etc.....	100 00
Total cost.....	\$1,331 40
State reward.....	350 00
Cost to county.....	\$981 40

Negaunee Township, Application No. 242.

Built by county, macadam, .521 mile, width of macadam 14 feet.	
Engineering expenses, including cost of survey and profile.....	\$75 00
Grading.....	1,265 42
Labor, including hauling (average length of haul, 2½ miles).....	1,056 21
Stone, 1,314 cubic yards at 85c per cubic yard.....	1,116 90
Rolling, including sprinkling.....	316 54
Culvert.....	42 41
Ditching.....	176 30
Camp building, miscellaneous supplies.....	134 42
Superintendence.....	100 00
Total cost.....	\$4,283 20
State reward.....	521 00
Cost to county.....	\$3,762 20

Negaunee Township, Application No. 438.

Built by county, macadam, .473 mile, width of macadam 14 feet.	
Engineering expenses, including cost of survey and profile.....	\$75 00
Grading.....	290 00
Labor, including hauling (average length of haul, 1½ miles).....	546 00
Stone, 1,134 cubic yards at 85c per cubic yard.....	963 90
Rolling, including sprinkling.....	321 00
Culvert.....	15 37
Camp building, miscellaneous supplies.....	132 31
Superintendence.....	100 00
Total cost.....	\$2,443 58
State reward.....	473 00
Cost to county.....	\$1,970 58

MASON COUNTY.

Amber Township, Application No. 46.

Built by county, macadam, 1 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$8 00
Grading.....	150 00
Labor, including hauling (average length of haul, ¾ mile).....	400 00
Stone, 1,625 cubic yards at \$1.44 per cubic yard.....	2,340 00
Rolling, including sprinkling.....	100 00
Culverts.....	40 00
Total cost.....	\$3,038 00
State reward.....	1,000 00
Cost to county.....	\$2,038 00

Amber and Custer Townships, Application No. 48.

Built prior to December 1st, 1906, by county, 1 mile, macadam.

Cost to county.....	\$2,912 20
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Amber and Custer Townships, Application No. 127.Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$11 50
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Grading.....	25 00
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Labor, including hauling (average length of haul, $2\frac{1}{2}$ miles).....	476 71
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Stone, 750 cubic yards at \$1.50 per cubic yard.....	1,125 00
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Rolling, including sprinkling.....	50 00
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Tube culvert.....	42 00
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Total cost.....	\$1,730 21
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State reward.....	500 00
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Cost to county.....	\$1,230 21
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Amber Township, Application No. 258.Built by county, "D", $\frac{1}{2}$ mile, width of metal 9 feet.

Engineering expenses, including cost of survey and profile.....	\$5 75
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Grading.....	25 00
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Labor, including hauling.....	200 00
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Stone, 400 cubic yards at \$1.44 per cubic yard, gravel, 500 cubic yards	
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at 80c per cubic yard.....	976 00
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Rolling, including sprinkling.....	50 00
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Total cost.....	\$1,256 75
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State reward.....	375 00
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Cost to county.....	\$881 75
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Custer and Riverton Townships, Application No. 49.

Built prior to December 1st, 1906, by county, 1 mile, macadam.

Cost to county.....	\$2,841 00
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Custer Township, Application No. 128.

Built by county, macadam, 1.002 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$11 50
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Grading.....	155 00
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Labor, including hauling (average length of haul, $1\frac{1}{2}$ miles).....	528 94
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Stone, 1,630 cubic yards at \$1.44 and \$1.50 per cubic yard.....	2,421 00
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Rolling, including sprinkling.....	90 00
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Concrete culvert.....	44 00
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Total cost.....	\$3,250 44
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State reward.....	1,002 00
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Cost to county.....	\$2,248 44
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Riverton Township, Application No. 257.

Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 ft.	
Engineering expenses, including cost of survey and profile.....	\$10 00
Grading.....	125 00
Labor, including hauling (average length of haul $1\frac{1}{2}$ miles).....	725 34
Stone, 760 cubic yards at \$1.40 per cubic yard.....	1,064 00
Rolling, including sprinkling.....	151 00
Coal.....	25 00
Total cost.....	\$2,100 34
State reward.....	500 00
Cost to county.....	\$1,600 34

Sheridan Township, Application No. 113.

Built prior to December 1st, 1906, by county, 1 mile, "A."	
Cost to county.....	\$554 80

Sherman and Victory Townships, Application No. 260.

Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$6 00
Grading.....	50 00
Labor, including hauling (average length of haul, 3 miles).....	552 00
Stone, 780 cubic yards at \$1.50 per cubic yard.....	1,170 00
Rolling, including sprinkling.....	60 00
Tile drains and culvert.....	120 00
Total cost.....	\$1,958 00
State reward.....	500 00
Cost to county.....	\$1,458 00

MECOSTA COUNTY.

Morton Township, Application No. 42.

Built prior to December 1st, 1906, by township, 2 miles, gravel.	
Cost to township.....	\$993 50

Wheatland Township, Application No. 148.

Built by township, gravel, 1.956 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$32 00
Grading.....	976 58
Labor, including hauling and rolling.....	2,543 54
Gravel.....	100 00
Tools and repairs.....	68 01
Preparing pit and road for hauling gravel.....	132 13
Culverts, paid for from bridge fund, \$180.00.	
Total cost.....	\$3,852 26
State reward.....	978 00
Cost to township.....	\$2,874 26

MENOMINEE COUNTY.

Ingallston and Menominee Townships, Application No. 239.

Built by county, gravel, 1.524 miles, width of gravel 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$2,140 00
Engineering expenses, including cost of survey and profile.....	21 00
Gravel.....	75 00
Iron culverts.....	140 00
Total cost.....	\$2 376 00
State reward.....	762 00
Cost to county.....	\$1,614 00

Menominee Township, Application No. 22.

Built prior to December 1st, 1906, by county, 1 mile, macadam.	
Cost to county.....	\$2,042 09

Menominee Township, Application No. 216.

Built by county, macadam, 1.03 miles, width of macadam 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$3,150 00
Engineering expenses, including cost of survey and profile.....	8 00
Total cost.....	\$3,158 00
State reward.....	1,030 00
Cost to county.....	\$2,128 00

Menominee Township, Application No. 314.

Built by county, macadam, 1 mile, width of macadam 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$2,039 46
Engineering expenses, including cost of survey and profile.....	11 00
Grading.....	248 80
Culverts.....	66 00
Total cost.....	\$2,365 26
State reward.....	1,000 00
Cost to county.....	\$1,365 26

Menominee Township, Application No. 315.

Built by county, macadam, .673 mile, width of macadam 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$1,337 60
Engineering expenses, including cost of survey and profile.....	5 00
Grading.....	256 53
Culverts.....	114 50
Total cost.....	\$1,713 63
State reward.....	673 00
Cost to county.....	\$1,040 63



Michigan avenue road, outside city limits of Detroit, before improvement.



Michigan avenue road, outside city limits of Detroit, after improvement by county road commission

Filer Township, Application No. 173.

Built by county, gravel, .504 mile, width of gravel 16 feet.

Engineering expenses, including cost of survey and profile.....	\$20 00
Gravel, 57c per cubic yard delivered on road.....	570 00

Total cost.....	\$590 00
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State reward.....	252 00
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Cost to county.....	\$338 00
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Manistee Township, Application No. 41.....

Built prior to December 1st, 1906, by county, 1.85 miles, gravel.

Cost to county.....	\$5,109 19
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Manistee Township, Application No. 75.

Built by county, gravel, 1.256 miles, width of gravel 16 feet.

Engineering expenses, including cost of survey and profile.....	\$30 00
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Grading done previously, cost about \$3,000.

Gravel, 68c per cubic yard delivered on road.....	1,639 90
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Rolling, including sprinkling.....	300 00
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Total cost.....	\$1,969 90
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State reward.....	628 00
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Cost to county.....	\$1,341 90
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Manistee Township, Application No. 330.

Built by county, gravel, 1 mile, width of gravel 12 feet.

Engineering expenses, including cost of survey and profile.....	\$15 00
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Grading.....	75 00
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Gravel, 2,400 cubic yards at 62c per yard delivered on road.....	1,488 00
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Rolling, including sprinkling.....	132 00
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Total cost.....	\$1,710 00
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State reward paid.....	375 00
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Cost to county.....	\$1,335 00
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\$125 more to be paid when some few changes are made.

Onekama Township, Application No. 24.

Built prior to December 1st, 1906, by county, 2 miles, gravel.

Cost to county.....	\$9,811 19
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Onekama Township, Application No. 76.Built prior to December 1st, 1906, by county, $\frac{1}{2}$ mile, gravel.

Cost to county.....	\$1,435 30
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STATE HIGHWAY DEPARTMENT

Onekama Township, Application No. 145.

Built by county, gravel, 1 mile, width of gravel 12 feet.	
Engineering expenses, including cost of survey and profile.....	\$25 00
Grading done by contract, contract price.....	1,498 00
Gravel, 2,238 cubic yards at 55c per yard delivered on road.....	1,230 90
Rolling, including sprinkling.....	125 00
Culverts.....	132 00
Sodding, 4,610 yards.....	276 60
Hauling dirt.....	75 00
Total cost.....	\$3,362 50
State reward.....	500 00
Cost to county.....	\$2,862 60

Pleasanton Township, Application No. 152.

Built by county, gravel, 1½ miles, width of gravel 12 feet.	
Grading done by contract, contract price.....	\$2,187 00
Engineering expenses, including cost of survey and profile.....	25 00
Gravel, 3,309 cubic yards at 54c per yard delivered on road.....	1,786 86
Rolling, including sprinkling.....	220 00
Concrete bridge.....	260 00
Culvert.....	60 00
Sodding.....	229 70
Total cost.....	\$4,768 56
State reward paid.....	650 00
Cost to county.....	\$4,118 56
\$100 to be paid when some changes are made.	

Pleasanton Township, Application No. 302.

Built by township, gravel, ½ mile, width of gravel 10 feet.	
Engineering expenses, including cost of survey and profile.....	\$16 30
Grading.....	40 00
Labor, including hauling (average length of haul, 1½ miles).....	517 00
Gravel, 1,073 cubic yards at 5c per cubic yard.....	53 65
Rolling, including sprinkling.....	64 00
Clay, 194½ yards.....	19 45
Hauling, loading and spreading clay.....	136 54
Total cost.....	\$846 94
State reward.....	250 00
Cost to township.....	\$596 94

MARQUETTE COUNTY.

Marquette Township, Application No. 247.

Built by county, macadam, 2 miles, width of macadam 14 feet.	
Engineering expenses, including cost of survey and profile, estimated...	\$450 00
Grading.....	4,469 78
Labor, including hauling (average length of haul, ½ mile).....	1,854 90
Stone, 3,448 cars at \$1.14½ per car.....	3,947 98
Rolling, including sprinkling.....	1,335 59
Culverts.....	272 39
Camp building, moving and maintenance and miscellaneous supplies...	1,637 45
Total cost.....	\$13,968 07
State reward.....	2,000 00
Cost to county.....	\$11,968 07

Marquette Township, Application No. 270.

Built by county, macadam, 2 miles, width of macadam 14 feet.

Engineering expenses, including cost of survey and profile, estimated...	\$450 00
Grading.....	3,554 58
Labor, including hauling (average length of haul, $\frac{3}{4}$ mile).....	1,684 16
Stone, 4,390 cubic yards at \$1.11 per cubic yard.....	4,872 90
Rolling, including sprinkling.....	1,397 80
Culverts.....	523 27
Camp building and miscellaneous supplies.....	396 32

Total cost.....	\$12,879 03
State reward.....	2,000 00

Cost to county.....	\$10,879 03
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Marquette Township, Application No. 396.

Built by county, macadam, .264 mile, width of macadam 14 feet.

Engineering expenses, including cost of survey and profile, estimated...	\$25 00
Grading.....	127 64
Labor, including hauling (average length of haul, $\frac{3}{4}$ mile).....	106 87
Stone, 366 cubic yards at \$1.11 per cubic yard.....	406 26
Rolling, including sprinkling, estimated.....	136 10
Camp building and supplies, estimated.....	50 00

Total cost.....	\$851 87
State reward.....	264 00

Cost to county.....	\$587 87
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Negaunee Township, Application No. 144.

Built by county, macadam, 1 mile, width of macadam 14 feet.

Engineering expenses, including cost of survey and profile.....	\$210 00
Grading.....	2,954 84
Labor, including hauling (average length of haul, $\frac{3}{4}$ mile).....	493 00
Stone, estimated 1,800 cubic yards at \$1.30 per cubic yard.....	2,340 00
Rolling, including sprinkling.....	676 00
Temporary roads, bridges, etc.....	124 89
Bridge.....	1,900 00
Culvert.....	64 71
Storing equipment and tools.....	114 79
Camp building and maintenance and miscellaneous supplies.....	816 27

Total cost.....	\$9,694 50
State reward.....	1,000 00

Cost to county.....	\$8,694 50
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Negaunee Township, Application No. 240.

Built by county, macadam, .465 mile, width of macadam 14 feet.

Engineering expenses, including cost of survey and profile.....	\$50 00
Grading.....	859 99
Labor, including hauling (average length of haul, $\frac{3}{4}$ mile).....	175 85
Stone, 754 cubic yards at \$.952 per cubic yard.....	707 80
Rolling, including sprinkling.....	198 00
Culverts.....	185 00
Temporary roads.....	20 25
Camp building, maintenance, etc.....	120 00

Total cost.....	\$2,316 89
State reward.....	465 00

Cost to county.....	\$1,851 89
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STATE HIGHWAY DEPARTMENT

Negaunee Township, Application No. 241.

Built by county, macadam, .35 mile, width of macadam 14 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	80 70
Labor, including hauling (average length of haul, 1½ miles).....	263 00
Stone, 534 cubic yards at \$1.30 per cubic yard.....	694 20
Rolling, including sprinkling.....	181 50
Camp building, maintenance, etc.....	100 00

Total cost.....	\$1,331 40
State reward.....	350 00

Cost to county.....	\$981 40
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Negaunee Township, Application No. 242.

Built by county, macadam, .521 mile, width of macadam 14 feet.

Engineering expenses, including cost of survey and profile.....	\$75 00
Grading.....	1,265 42
Labor, including hauling (average length of haul, 2¼ miles).....	1,056 21
Stone, 1,314 cubic yards at 85c per cubic yard.....	1,116 90
Rolling, including sprinkling.....	316 54
Culvert.....	42 41
Ditching.....	176 30
Camp building, miscellaneous supplies.....	134 42
Superintendence.....	100 00

Total cost.....	\$4,283 20
State reward.....	521 00

Cost to county.....	\$3,762 20
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Negaunee Township, Application No. 438.

Built by county, macadam, .473 mile, width of macadam 14 feet.

Engineering expenses, including cost of survey and profile.....	\$75 00
Grading.....	290 00
Labor, including hauling (average length of haul, 1½ miles).....	546 00
Stone, 1,134 cubic yards at 85c per cubic yard.....	963 90
Rolling, including sprinkling.....	321 00
Culvert.....	15 37
Camp building, miscellaneous supplies.....	132 31
Superintendence.....	100 00

Total cost.....	\$2,443 58
State reward.....	473 00

Cost to county.....	\$1,970 58
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MASON COUNTY.

Amber Township, Application No. 46.

Built by county, macadam, 1 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$8 00
Grading.....	150 00
Labor, including hauling (average length of haul, ¾ mile).....	400 00
Stone, 1,625 cubic yards at \$1.44 per cubic yard.....	2,340 00
Rolling, including sprinkling.....	100 00
Culverts.....	40 00

Total cost.....	\$3,038 00
State reward.....	1,000 00

Cost to county.....	\$2,038 00
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Amber and Custer Townships, Application No. 48.

Built prior to December 1st, 1906, by county, 1 mile, macadam.

Cost to county.....	\$2,912 20
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Amber and Custer Townships, Application No. 127.Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$11 50
Grading.....	25 00
Labor, including hauling (average length of haul, $2\frac{1}{2}$ miles).....	476 71
Stone, 750 cubic yards at \$1.50 per cubic yard.....	1,125 00
Rolling, including sprinkling.....	50 00
Tube culvert.....	42 00

Total cost.....	\$1,730 21
State reward.....	500 00

Cost to county.....	\$1,230 21
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Amber Township, Application No. 258.Built by county, "D", $\frac{1}{2}$ mile, width of metal 9 feet.

Engineering expenses, including cost of survey and profile.....	\$5 75
Grading.....	25 00
Labor, including hauling.....	200 00
Stone, 400 cubic yards at \$1.44 per cubic yard, gravel, 500 cubic yards at 80c per cubic yard.....	976 00
Rolling, including sprinkling.....	50 00

Total cost.....	\$1,256 75
State reward.....	375 00

Cost to county.....	\$881 75
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Custer and Riverton Townships, Application No. 49.

Built prior to December 1st, 1906, by county, 1 mile, macadam.

Cost to county.....	\$2,841 00
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Custer Township, Application No. 128.

Built by county, macadam, 1.002 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$11 50
Grading.....	155 00
Labor, including hauling (average length of haul, $1\frac{1}{2}$ miles).....	528 94
Stone, 1,630 cubic yards at \$1.44 and \$1.50 per cubic yard.....	2,421 00
Rolling, including sprinkling.....	90 00
Concrete culvert.....	44 00

Total cost.....	\$3,250 44
State reward.....	1,002 00

Cost to county.....	\$2,248 44
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Custer and Riverton Townships, Application No. 259.

Built by county, gravel, .748 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$4 00
Grading.....	100 00
Labor, including hauling (average length of haul, 1 $\frac{1}{4}$ miles).....	675 00
Gravel, 20c per cubic yard.....	180 00
Rolling, including sprinkling.....	6 00
Culvert.....	20 00
Total cost.....	\$985 00
State reward.....	374 00
Cost to county.....	\$611 00

Custer Township, Application No. 261.

Built by county, macadam, 1.054 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$9 00
Grading.....	100 00
Labor, including hauling (average length of haul, 1 $\frac{1}{4}$ miles).....	520 00
Stone, \$1.44 per cubic yard.....	2,866 00
Rolling, including sprinkling.....	125 00
Tile drain and two culverts.....	240 00
Total cost.....	\$3,860 00
State reward.....	1,054 00
Cost to county.....	\$2,806 00

Custer and Riverton Townships, Application No. 267.

Built by county, gravel, $\frac{1}{2}$ mile, width of gravel 12 feet.	
Engineering expenses, including cost of survey and profile.....	\$10 00
Grading.....	300 00
Labor, including hauling (average length of haul, $\frac{1}{2}$ mile).....	1,080 00
Gravel, 1,860 cubic yards at 20c per cubic yard.....	372 00
Rolling, including sprinkling.....	58 00
Culverts.....	40 00
Other expenses.....	340 00
Total cost.....	\$2,200 00
State reward.....	250 00
Cost to county.....	\$1,950 00

Custer, Eden and Riverton Townships, Application No. 439.

Built by county, gravel, $\frac{1}{2}$ mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$4 00
Grading.....	80 00
Labor, including hauling (average length of haul, 1 $\frac{1}{4}$ miles).....	675 00
Gravel, 900 cubic yards at 20c per cubic yard.....	180 00
Rolling, including sprinkling.....	8 00
Culverts.....	40 00
Total cost.....	\$987 00
State reward.....	250 00
Cost to county.....	\$737 00

Grant Township, Application No. 421.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$7 00
Grading.....	66 75
Labor, including hauling (average length of haul, 1½ miles).....	877 99
Rolling, including sprinkling.....	7 00
Putting in culverts.....	18 00
Opening gravel pit.....	46 22
Patching road to haul.....	100 00
Total cost.....	<u>\$1,122 96</u>
State reward.....	500 00
Cost to township.....	<u>\$622 96</u>

Pere Marquette Township, Application No. 47.

Built prior to December 1st, 1906, by county, 1 mile, macadam.	
Cost to county.....	\$1,913 15

Pere Marquette Township, Application No. 122.

Built by county, macadam, 1 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$7 00
Grading.....	210 00
Labor, including hauling (average length of haul, 2½ miles).....	1,292 04
Stone, 1,550 cubic yards at \$1.44 per cubic yard.....	2,232 00
Rolling, including sprinkling.....	285 75
Coal.....	52 32
Culverts.....	30 00
Total cost.....	<u>\$4,109 11</u>
State reward.....	1,000 00
Cost to county.....	<u>\$3,109 11</u>

Pere Marquette Township, Application No. 256.

Built by county, macadam, .355 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$10 00
Grading.....	50 00
Labor, including hauling (average length of haul, ¾ mile).....	525 50
Stone, 750 cubic yards at \$1.40 per cubic yard.....	1,050 00
Rolling, including sprinkling.....	126 00
Coal.....	25 00
Culvert.....	15 00
Total cost.....	<u>\$1,801 50</u>
State reward.....	355 00
Cost to county.....	<u>\$1,446 50</u>

Riverton Township, Application No. 257.

Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 ft.	
Engineering expenses, including cost of survey and profile.....	\$10 00
Grading.....	125 00
Labor, including hauling (average length of haul $1\frac{1}{2}$ miles).....	725 34
Stone, 760 cubic yards at \$1.40 per cubic yard.....	1,064 00
Rolling, including sprinkling.....	151 00
Coal.....	25 00
Total cost.....	\$2,100 34
State reward.....	500 00
Cost to county.....	\$1,600 34

Sheridan Township, Application No. 113.

Built prior to December 1st, 1906, by county, 1 mile, "A."	
Cost to county.....	\$554 80

Sherman and Victory Townships, Application No. 260.

Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$6 00
Grading.....	50 00
Labor, including hauling (average length of haul, 3 miles).....	552 00
Stone, 780 cubic yards at \$1.50 per cubic yard.....	1,170 00
Rolling, including sprinkling.....	60 00
Tile drains and culvert.....	120 00
Total cost.....	\$1,958 00
State reward.....	500 00
Cost to county.....	\$1,458 00

MECOSTA COUNTY.

Morton Township, Application No. 42.

Built prior to December 1st, 1906, by township, 2 miles, gravel.	
Cost to township.....	\$993 50

Wheatland Township, Application No. 148.

Built by township, gravel, 1.956 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$32 00
Grading.....	976 58
Labor, including hauling and rolling.....	2,543 54
Gravel.....	100 00
Tools and repairs.....	68 01
Preparing pit and road for hauling gravel.....	132 13
Culverts, paid for from bridge fund, \$180.00.	
Total cost.....	\$3,852 26
State reward.....	978 00
Cost to township.....	\$2,874 26

MENOMINEE COUNTY.

Ingallston and Menominee Townships, Application No. 239.

Built by county, gravel, 1.524 miles, width of gravel 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$2,140 00
Engineering expenses, including cost of survey and profile.....	21 00
Gravel.....	75 00
Iron culverts.....	140 00
Total cost.....	\$2 376 00
State reward.....	762 00
Cost to county.....	\$1,614 00

Menominee Township, Application No. 22.

Built prior to December 1st, 1906, by county, 1 mile, macadam.	
Cost to county.....	\$2,042 09

Menominee Township, Application No. 216.

Built by county, macadam, 1.03 miles, width of macadam 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$3,150 00
Engineering expenses, including cost of survey and profile.....	8 00
Total cost.....	\$3,158 00
State reward.....	1,030 00
Cost to county.....	\$2,128 00

Menominee Township, Application No. 314.

Built by county, macadam, 1 mile, width of macadam 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$2,039 46
Engineering expenses, including cost of survey and profile.....	11 00
Grading.....	248 80
Culverts.....	66 00
Total cost.....	\$2,365 26
State reward.....	1,000 00
Cost to county.....	\$1,365 26

Menominee Township, Application No. 315.

Built by county, macadam, .673 mile, width of macadam 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$1,337 60
Engineering expenses, including cost of survey and profile.....	5 00
Grading.....	256 53
Culverts.....	114 50
Total cost.....	\$1,713 63
State reward.....	673 00
Cost to county.....	\$1,040 63

STATE HIGHWAY DEPARTMENT

Menominee Township, Application No. 418.

Built by county, gravel, 1.296 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$10 00
Grading.....	170 00
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	673 20
Gravel, 2,240 cubic yards at 7 $\frac{1}{2}$ c per cubic yard.....	168 00
Rolling, including sprinkling.....	51 00
Ditching.....	27 00
Total cost.....	\$1,099 20
State reward.....	648 00
Cost to county.....	\$451 20

Menominee Township, Application No. 422.

Built by county, gravel, .232 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$2 00
Grading.....	30 00
Labor, including hauling (average length of haul, $\frac{1}{4}$ mile).....	118 80
Gravel, 400 cubic yards at 7 $\frac{1}{2}$ c per cubic yard.....	30 00
Rolling, including sprinkling.....	9 00
Ditching.....	4 50
Total cost.....	\$194 30
State reward.....	116 00
Cost to county.....	\$78 30

Menominee Township, Application No. 428.

Built by county, macadam, .327 mile, width of macadam 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$668 80
Engineering expenses, including cost of survey and profile.....	3 00
Grading.....	128 27
Total cost.....	\$800 07
State reward.....	327 00
Cost to county.....	\$473 07

Nadeau Township, Application No. 316.

Built by county, macadam, 1 mile, width of macadam 9 feet.	
Built by contract, contract price (Robert Rick, Menominee, contractor)	\$2,023 50
Engineering expenses, including cost of survey and profile.....	8 00
Grading.....	342 89
Culverts.....	107 06
Ditching.....	30 50
Total cost.....	\$2,511 95
State reward.....	1,000 00
Cost to county.....	\$1,511 95

Stephenson Township, Application No. 23.

Built prior to December 1st, 1906, by county, 1 $\frac{1}{2}$ miles, gravel.	
Cost to county.....	\$2,326 24



State reward macadam road in Muskegon county. Built of limestone by county road commission.



State reward macadam road in Muskegon county. Built of limestone by county road commission. Farmers, business men and resorters are united in pushing good road building in Muskegon county.

MONROE COUNTY.

Bedford Township, Application No. 78.

Built by township, macadam, 2 miles, width of macadam 9 feet.	
Built by contract, contract price (H. H. Sterns, Temperance, contractor)	\$2,500 00
Engineering expenses, including cost of survey and profile.....	40 00
Grading.....	400 00
Total cost.....	\$2,940 00
State reward.....	1,000 00
Cost to township.....	\$1,940 00

MONTCALM COUNTY.

Cato Township, Application No. 115.

Built by subscription, gravel, 1 mile, width of gravel 9 feet.	
Built by contract for amount of state reward (Macomber & Bale, Lakeview, contractors).	
Grading, estimated.....	\$400 00
Gravel, 1,500 cubic yards at 25c per yard, estimated.....	375 00
Rolling, including sprinkling, estimated.....	50 00
Culverts, put in by statute labor, cement furnished by township, estimated.....	75 00
Total cost, estimated.....	\$900 00
State reward.....	500 00
	\$400 00

Douglass and Sidney Townships, Application No. 465.

Built by Stanton Good Roads Association, gravel, 2½ miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$27 65
Grading.....	402 82
Labor, including hauling (average length of haul, 2 miles).....	2,131 30
Gravel, 4,000 cubic yards at 2 9-10c per cubic yard.....	116 00
Rolling, including sprinkling.....	100 00
Shovels, dump-boards, plough points, etc.....	34 27
Total cost.....	\$2,812 04
State reward.....	1,250 00
Cost to association.....	\$1,562 04

MUSKEGON COUNTY

Casnovia Township, Application No. 300.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$11 92
Grading.....	456 99
Labor, including hauling (average length of haul, 2½ miles).....	1,231 72
Gravel, 1,331 cubic yards at 10c per cubic yard.....	133 10
Rolling, including sprinkling.....	115 25
Culverts.....	87 24
Uncovering pit.....	170 35
Going across farm.....	12 00
Watching gap.....	22 50
Looking gravel.....	5 50

Total cost.....	\$2,246 57
State reward.....	500 00

Cost to township.....	\$1,746 57
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Dalton Township, Application No. 271.

Built by county, macadam, 1 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$18 10
Grading.....	268 50
Labor, including hauling (average length of haul, 4½ miles).....	1,732 00
Stone, 1,575 cubic yards at \$1.25 per cubic yard.....	1,968 75
Rolling, including sprinkling.....	110 00

Total cost.....	\$4,097 35
State reward.....	1,000 00

Cost to county.....	\$3,097 35
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Egelston Township, Application No. 244.

Built by county, macadam, 2.254 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$51 58
Grading.....	563 52
Labor, including hauling (average length of haul, 1½ miles).....	1,297 56
Stone, \$1.88 per cubic yard.....	6,348 42
Rolling, including sprinkling.....	305 00

Total cost.....	\$8,566 08
State reward.....	2,254 00

Cost to county.....	\$6,312 08
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Egelston Township, Application No. 331.

Built by county, macadam, .131 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$3 22
Grading.....	35 22
Labor, including hauling (average length of haul, 1½ miles).....	81 10
Stone, \$1.89 per cubic yard.....	396 78
Rolling, including sprinkling.....	19 06

Total cost.....	\$535 38
State reward.....	131 00

Cost to county.....	\$404 38
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Holton Township, Application No. 444.

Built by county, macadam, 2.005 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$28 00
Grading.....	2,008 02
Labor, including hauling (average length of haul, 1½ miles).....	1,390 47
Stone.....	5,263 33
Rolling, including sprinkling.....	458 27
Culverts.....	78 40
Hay and straw for bottom.....	56 49
Lumber.....	5 41
Total cost.....	\$9,288 39
State reward.....	2,005 00
Cost to county.....	\$7,283 39

Laketon and Muskegon Townships, Application No. 272.

Built by county, macadam, .322 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$16 10
Grading.....	121 63
Labor, including hauling (average length of haul, 2 miles).....	241 50
Stone, 485 cubic yards at \$1.25 per cubic yard.....	606 25
Rolling, including sprinkling.....	38 75
Total cost.....	\$1,024 23
State reward.....	322 00
Cost to county.....	\$702 23

Muskegon Township, Application No. 243.

Built by county, macadam, 1.003 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$23 00
Grading.....	180 00
Labor, including hauling (average length of haul, 1½ miles).....	722 07
Stone.....	2,569 00
Rolling, including sprinkling.....	159 20
Total cost.....	\$3,653 27
State reward.....	1,003 00
Cost to county.....	\$2,650 27

Muskegon Township, Application No. 268.

Built by county, macadam, .184 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$6 00
Grading.....	45 00
Labor, including hauling (average length of haul, 1½ miles).....	180 52
Stone.....	642 25
Rolling, including sprinkling.....	39 80
Total cost.....	\$913 57
State reward.....	184 00
Cost to county.....	\$729 57

Norton Township, Application No. 209.

Built by township, macadam, 1 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$14 50
Grading.....	100 00
Labor, including hauling (average length of haul, 1 $\frac{1}{2}$ miles).....	1,268 00
Stone.....	2,410 26
Rolling, including sprinkling.....	100 00
Tile and culvert.....	165 00
Cinders for shoulders.....	302 91
Total cost.....	<u>\$4,360 67</u>
State reward.....	1,000 00
Cost to township.....	<u>\$3,360 67</u>

Norton Township, Application No. 368.

Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$15 60
Grading.....	174 00
Labor, including hauling (average length of haul, 3 miles)	593 97
Stone.....	1,116 28
Rolling, including sprinkling.....	78 32
Total cost.....	<u>\$1,978 17</u>
State reward.....	500 00
Cost to county.....	<u>\$1,478 17</u>

Norton Township, Application No. 369.

Built by county, macadam, .748 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$15 60
Grading.....	228 50
Labor, including hauling (average length of haul, 2 $\frac{1}{4}$ miles).....	756 50
Stone.....	1,926 14
Rolling, including sprinkling.....	134 29
Total cost.....	<u>\$3,061 03</u>
State reward.....	748 00
Cost to county.....	<u>\$2,313 03</u>

OAKLAND COUNTY.

Bloomfield Township, Application No. 13.

Built by township, gravel, 1.07 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$5 00
Grading.....	175 00
Labor, including hauling (average length of haul, 1 $\frac{1}{2}$ miles).....	1,445 12
Gravel.....	267 30
Rolling, including sprinkling.....	32 00
Culverts.....	25 00
Total cost.....	<u>\$1,949 42</u>
State reward.....	535 00
Cost to township.....	<u>\$1,414 42</u>

Bloomfield Township, Application No. 265.

Built by township, gravel, 1.01 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	75 00
Labor, including hauling (average length of haul, 2½ miles).....	1,644 39
Gravel, 1,800 cubic yards at 11½¢ per cubic yard.....	207 00
Rolling, including sprinkling.....	32 00
Total cost.....	\$1,970 39
State reward.....	505 00
Cost to township.....	\$1,465 39

OCEANA COUNTY.

Golden Township, Application No. 213.

Built by township, macadam, 1 mile, width of macadam, 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$16 00
Grading.....	82 50
Labor, including hauling (average length of haul, ½ mile).....	728 84
Stone, 1,413 cubic yards at \$1.55 per cubic yard.....	2,190 15
Rolling, including sprinkling.....	209 90
Pumping water.....	61 85
Coal.....	24 49
Tools and dynamite.....	8 74
Repairs.....	1 00
Total cost.....	\$3,323 47
State reward.....	1,000 00
Cost to township.....	\$2,323 47

Hart Township, Application No. 388.

Built by township, macadam, 1.892 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$23 50
Grading.....	850 00
Labor, including hauling (average length of haul, 1½ miles).....	2,725 55
Stone.....	3,890 91
Rolling, including sprinkling.....	563 12
Culverts.....	97 25
Mason work.....	11 50
Repairs.....	73 29
Telegrams.....	2 89
Printing.....	1 00
Tools.....	51 67
Total cost.....	\$8,290 68
State reward.....	1,892 00
Cost to township.....	\$6,398 68

Newfield Township, Application No. 109.

Built prior to December 1st, 1906, by township, 1 mile, gravel.	
Cost to township.....	\$963 14

Bridgeport Township, Application No. 226.

Built by county, macadam, .068 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$2 00
Grading.....	30 60
Labor, including hauling.....	103 03
Stone.....	153 83
Total cost.....	\$289 46
State reward.....	68 00
Cost to county.....	\$221 46

Bridgeport and Spaulding Townships, Application No. 294.

Built by county, macadam, 2.11 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	1,317 40
Labor, including hauling (average length of haul, 1½ mile).....	1,908 51
Stone.....	4,822 87
Rolling, including sprinkling.....	320 00
Total cost.....	\$8,392 78
State reward.....	2,110 00
Cost to county.....	\$6,282 78

Buena Vista and Saginaw Townships, Application No. 2.

Built prior to December 1st, 1906, by county, 2 miles, macadam.	
Cost to county.....	\$4,860 00

Buena Vista Township, Application No. 36.

Built prior to December 1st, 1906, by county, 1.043 miles, macadam.	
Cost to county.....	\$3,514 00

Buena Vista Township, Application No. 37.

Built prior to December 1st, 1906, by county, .974 mile, macadam.	
Cost to county.....	\$2,906 00

Buena Vista Township, Application No. 37.

Built by county, macadam, ¼ mile, width of macadam, 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$3 00
Grading.....	100 00
Labor, including hauling.....	369 98
Stone.....	606 11
Rolling, including sprinkling.....	40 00
Total cost.....	\$1,119 09
State reward.....	250 00
Cost to county.....	\$869 09

Bridgeport Township, Application No. 226.

Built by county, macadam, .068 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$2 00
Grading.....	30 60
Labor, including hauling.....	103 03
Stone.....	153 83
Total cost.....	\$289 46
State reward.....	68 00
Cost to county.....	\$221 46

Bridgeport and Spaulding Townships, Application No. 294.

Built by county, macadam, 2.11 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	1,317 40
Labor, including hauling (average length of haul, 1½ mile).....	1,908 51
Stone.....	4,822 87
Rolling, including sprinkling.....	320 00
Total cost.....	\$8,392 78
State reward.....	2,110 00
Cost to county.....	\$6,282 78

Buena Vista and Saginaw Townships, Application No. 2.

Built prior to December 1st, 1906, by county, 2 miles, macadam.	
Cost to county.....	\$4,860 00

Buena Vista Township, Application No. 36.

Built prior to December 1st, 1906, by county, 1.043 miles, macadam.	
Cost to county.....	\$3,514 00

Buena Vista Township, Application No. 37.

Built prior to December 1st, 1906, by county, .974 mile, macadam.	
Cost to county.....	\$2,906 00

Buena Vista Township, Application No. 37.

Built by county, macadam, ¼ mile, width of macadam, 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$3 00
Grading.....	100 00
Labor, including hauling.....	369 98
Stone.....	606 11
Rolling, including sprinkling.....	40 00
Total cost.....	\$1,119 09
State reward.....	250 00
Cost to county.....	\$869 09

STATE HIGHWAY DEPARTMENT

Buena Vista Township, Application No. 125.

Built by county, macadam, 1.063 miles, width of macadam, 9 feet.

Engineering expenses, including cost of survey and profile.....	\$30 00
Grading.....	680 00
Labor, including hauling.....	1,282 00
Stone.....	1,968 30
Tile drain.....	240 00
Concrete culverts.....	300 00

Total cost.....	\$4,500 30
State reward.....	1,063 00

Cost to county.....	\$3,437 30
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Buena Vista Township, Application No. 201.

Built by county, macadam, .92 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	530 04
Labor, including hauling (average length of haul, 1½ miles).....	1,300 88
Stone.....	2,490 46
Rolling, including sprinkling.....	140 00

Total cost.....	\$4,473 38
State reward.....	920 00

Cost to county.....	\$3,553 38
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Buena Vista Township, Application No. 202.

Built by county, macadam, 1.11 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	923 24
Labor, including hauling (average length of haul, 2 miles).....	1,613 27
Stone.....	2,524 67
Rolling, including sprinkling.....	160 00

Total cost.....	\$5,233 18
State reward.....	1,110 00

Cost to county.....	\$4,123 18
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Buena Vista Township, Application No. 203.

Built by county, macadam, 1.072 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$15 88
Grading.....	693 40
Labor, including hauling (average length of haul, 1½ miles).....	1,018 92
Stone.....	2,298 81
Rolling, including sprinkling.....	215 00
Culverts.....	23 10

Total cost.....	\$4,265 11
State reward.....	1,072 00

Cost to county.....	\$3,193 11
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Buena Vista Township, Application No. 291.

Built by county, macadam, 1.097 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	576 83
Labor, including hauling (average length of haul, 2 miles).....	1,453 26
Stone.....	2,458 61
Rolling, including sprinkling.....	150 00
Concrete culvert.....	375 00
Other expenses.....	8 00

Total cost.....	\$5,033 70
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State reward.....	1,097 00
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Cost to county.....	\$3,936 70
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Carrollton Township, Application No. 32.

Built by county, gravel, 1.11 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	700 00
Labor, including hauling (average length of haul, 1½ miles).....	1,077 31
Gravel.....	1,731 15
Rolling, including sprinkling.....	120 00

Total cost.....	\$3,652 46
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State reward.....	555 00
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Cost to county.....	\$3,097 46
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Carrollton Township, Application No. 176.

Built by county, macadam, .594 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	225 00
Labor, including hauling (average length of haul, 3 miles).....	810 90
Stone.....	1,163 58
Rolling, including sprinkling.....	78 00

Total cost.....	\$2,289 48
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State reward.....	594 00
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Cost to county.....	\$1,695 48
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Carrollton and Kochville Townships, Application No. 289.

Built by county, macadam, .493 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	117 64
Labor, including hauling (average length of haul, 3½ miles).....	699 12
Stone.....	1,104 69
Rolling, including sprinkling.....	69 50

Total cost.....	\$2,002 95
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State reward.....	493 00
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Cost to county.....	\$1,509 95
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Newfield Township, Application No. 168.

Built by township, gravel, $\frac{1}{4}$ mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$7 00
Grading.....	105 75
Labor, including hauling.....	182 37
Rolling, including sprinkling.....	15 09
Total cost.....	\$310 21
State reward.....	125 00
Cost to township.....	\$185 21

Newfield Township, Application No. 170.

Built by township, gravel, $\frac{1}{4}$ mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$5 00
Grading.....	324 16
Labor, including hauling (average length of haul, $1\frac{1}{4}$ miles).....	427 33
Rolling, including sprinkling.....	28 17
Total cost.....	\$784 66
State reward.....	125 00
Cost to township.....	\$659 66

Newfield Township, Application No. 171.

Built by township, gravel, $\frac{1}{4}$ mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$10 00
Grading.....	315 60
Labor, including hauling.....	499 92
Rolling, including sprinkling.....	18 32
Culverts.....	81 23
Total cost.....	\$925 07
State reward.....	250 00
Cost to township.....	\$675 07

Shelby Township, Application No. 3.

Built prior to December 1st, 1906, by township, $1\frac{1}{4}$ miles, macadam.	
Cost to township.....	\$2,589 66

Shelby Township, Application No. 69.

Built prior to December 1st, 1906, by township, 1.818 miles, macadam.	
Cost to township.....	\$2,430 87

Shelby Township, Application No. 178.

Built by township, macadam, 1.013 miles, width of macadam 10 feet.	
Engineering expenses, including cost of survey and profile.....	\$35 00
Grading.....	500 00
Labor, including crushing and hauling (average length of haul, $\frac{1}{4}$ mile)	1,450 00
Rolling, including sprinkling.....	105 00
Culverts and drains.....	350 00
Fuel.....	72 50
Total cost.....	\$2,512 50
State reward.....	1,013 00
Cost to township.....	\$1,499 50

Shelby Township, Application No. 179.

Built by township, macadam, 1.03 miles, width of macadam 10 feet.	
Engineering expenses, including cost of survey and profile.....	\$26 50
Grading.....	403 58
Labor.....	1,463 64
Stone.....	681 00
Rolling, including sprinkling.....	55 00
Fuel.....	27 39
Supplies for highway.....	56 24
Culverts.....	89 86
Cement.....	5 55
Tiling.....	16 77
Total cost.....	\$2,825 53
State reward.....	1,030 00
Cost to township.....	\$1,795 53

Shelby Township, Application No. 384.

Built by township, macadam, .996 mile, width of macadam 10 feet.	
Engineering expenses, including cost of survey and profile.....	\$16 50
Grading.....	307 14
Labor, including hauling (average length of haul, 1 mile).....	1,427 28
Stone.....	762 00
Fuel.....	54 77
Supplies for highway.....	112 47
Culverts.....	39 71
Cement.....	11 10
Tiling.....	33 53
Total cost.....	\$2,764 50
State reward.....	996 00
Cost to township.....	\$1,768 50

OSCEOLA COUNTY.

Evart Township, Application No. 28.

Built prior to December 1st, 1906, by township, 1 mile gravel.

Cost to township.....	\$1,124 34
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Evart Township, Application No. 28.

Built by township, gravel, 1 mile, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$4 00
Grading and stumping.....	503 49
Labor, including hauling (average length of haul, 2½ miles).....	1,000 00
Rolling, including sprinkling.....	25 00
Other expenses.....	76 50
Total cost.....	\$1,608 99
State reward.....	500 00
Cost to township.....	\$1,108 99

Hersey Township, Application No. 326.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$11 50
Grading.....	622 26
Labor, including hauling (average length of haul, 1 mile).....	560 74
Gravel, 1500 cubic yards at 5c per cubic yard.....	75 00
Rolling, including sprinkling.....	50 00
Culverts.....	135 00
Total cost.....	<u>\$1,454 50</u>
State reward.....	500 00
Cost to township.....	<u>\$954 50</u>

Hersey Township, Application No. 413.

Built by township, gravel, .156 mile, width of gravel 9 feet.	
Grading.....	\$100 00
Labor, including hauling (average length of haul, 1½ miles).....	100 50
Gravel, 215 cubic yards at 5c per cubic yard.....	10 75
Rolling, including sprinkling.....	5 00
Other expenses.....	10 00
Total cost.....	<u>\$226 25</u>
State reward.....	78 00
Cost to township.....	<u>\$148 25</u>

Marion Township, Application No. 253.

Built by township, gravel, 2.008 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$29 18
Grading.....	1,921 98
Labor, including uncovering gravel pit and hauling (average length of haul, 1½ miles).....	1,934 14
Gravel, 3,029 cubic yards; 1,708 cubic yards at 10c, balance from township pit.	170 80
Rolling, including sprinkling.....	16 10
Culverts.....	114 08
Blacksmithing.....	7 45
Hardware bill—shovels, grub-hoes, dynamite, coal-shutes, bolts and repairs.....	34 46
Livery bill.....	1 50
Total cost.....	<u>\$4,229 69</u>
State reward.....	1,004 00
Cost to township.....	<u>\$3,225 69</u>

Orient Township, Application No. 153.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$11 00
Grading.....	270 00
Labor and gravel.....	1,227 09
Rolling, including sprinkling.....	5 00
Other expenses.....	30 00
Total cost.....	<u>\$1,543 09</u>
State reward.....	500 00
Cost to township.....	<u>\$1,043 09</u>

Osceola Township, Application No. 139.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	973 53
Labor, including hauling (average length of haul, 1 mile).....	617 53
Gravel.....	149 00
Rolling, including sprinkling.....	6 00
Other expenses.....	65 00
Total cost.....	\$1,823 06
State reward.....	500 00
Cost to township.....	\$1,323 06

SAGINAW COUNTY.

Birch Run Township, Application No. 80.

Built prior to December 1st, 1906, by county, .997 mile macadam.

Cost to county.....	\$2,546 71
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Birch Run Township, Application No. 210.

Built by county, macadam, $\frac{1}{2}$ mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$9 25
Grading.....	235 00
Labor, including hauling.....	441 65
Stone.....	1,038 09
Rolling, including sprinkling.....	52 61
Culverts.....	8 25
Freight on machinery.....	9 30
Coal.....	15 00
Total cost.....	\$1,809 15
State reward.....	500 00
Cost to county.....	\$1,309 15

Birch Run Township, Application No. 211.

Built by county, macadam, .523 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$9 50
Grading.....	245 00
Labor, including hauling.....	442 65
Stone.....	1,056 81
Rolling, including sprinkling.....	53 12
Culverts.....	8 55
Freight on machinery.....	9 60
Coal.....	14 22
Total cost.....	\$1,839 45
State reward.....	523 00
Cost to county.....	\$1,316 45

Birch Run Township, Application No. 411.

Built by county, macadam, 509 mile.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading, estimated.....	200 00
Labor, including hauling (average length of haul, $\frac{1}{2}$ mile)	447 45
Stone.....	1,435 13
Rolling, including sprinkling.....	80 00

Total cost.....	\$2,174 58
State reward.....	509 00

Cost to county.....	\$1,665 58
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Blumfield Township, Application No. 293.

Built by county, macadam, 1.015 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	600 00
Labor, including hauling (average length of haul, $1\frac{1}{2}$ miles).....	1,435 06
Stone.....	2,439 88
Rolling, including sprinkling.....	150 00

Total cost.....	\$4,636 94
State reward.....	1,015 00

Cost to county.....	\$3,621 94
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Bridgeport and Spaulding Townships, Application No. 35.

Built prior to December 1st, 1906, by county, $1\frac{1}{2}$ miles, macadam.

Cost to county.....	\$2,875 00
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Bridgeport Township, Application No. 124.

Built by county, macadam, 1.604 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$33 00
Grading.....	675 00
Labor, including hauling.....	1,649 61
Stone.....	3,618 66
Rolling, including sprinkling.....	130 00
Coal.....	40 55

Total cost.....	\$6,146 82
State reward.....	1,604 00

Cost to county.....	\$4,542 82
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Bridgeport and Spaulding Townships, Application No. 205.

Built by county, macadam, .99 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	499 69
Labor, including hauling.....	1,009 99
Stone.....	2,368 09
Rolling, including sprinkling.....	160 00

Total cost.....	\$4,049 77
State reward.....	990 00

Cost to county.....	\$3,059 77
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A state reward macadam road in Bay county, built of limestone by county road commission. The pioneer good roads county of Michigan. This county is noted for its good farms, good coal and good roads.

Bridgeport Township, Application No. 226.

Built by county, macadam, .068 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$2 00
Grading.....	30 60
Labor, including hauling.....	103 03
Stone.....	153 83
Total cost.....	\$289 46
State reward.....	68 00
Cost to county.....	\$221 46

Bridgeport and Spaulding Townships, Application No. 294.

Built by county, macadam, 2.11 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	1,317 40
Labor, including hauling (average length of haul, 1½ mile).....	1,908 51
Stone.....	4,822 87
Rolling, including sprinkling.....	320 00
Total cost.....	\$8,392 78
State reward.....	2,110 00
Cost to county.....	\$6,282 78

Buena Vista and Saginaw Townships, Application No. 2.

Built prior to December 1st, 1906, by county, 2 miles, macadam.	
Cost to county.....	\$4,860 00

Buena Vista Township, Application No. 36.

Built prior to December 1st, 1906, by county, 1.043 miles, macadam.	
Cost to county.....	\$3,514 00

Buena Vista Township, Application No. 37.

Built prior to December 1st, 1906, by county, .974 mile, macadam.	
Cost to county.....	\$2,906 00

Buena Vista Township, Application No. 37.

Built by county, macadam, ¼ mile, width of macadam, 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$3 00
Grading.....	100 00
Labor, including hauling.....	369 98
Stone.....	606 11
Rolling, including sprinkling.....	40 00
Total cost.....	\$1,119 09
State reward.....	250 00
Cost to county.....	\$869 09

Buena Vista Township, Application No. 125.

Built by county, macadam, 1.063 miles, width of macadam, 9 feet.

Engineering expenses, including cost of survey and profile.....	\$30 00
Grading.....	680 00
Labor, including hauling.....	1,282 00
Stone.....	1,968 30
Tile drain.....	240 00
Concrete culverts.....	300 00

Total cost.....	\$4,500 30
State reward.....	1,063 00

Cost to county.....	\$3,437 30
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Buena Vista Township, Application No. 201.

Built by county, macadam, .92 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	530 04
Labor, including hauling (average length of haul, 1 1/4 miles).....	1,300 88
Stone.....	2,490 46
Rolling, including sprinkling.....	140 00

Total cost.....	\$4,473 38
State reward.....	920 00

Cost to county.....	\$3,553 38
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Buena Vista Township, Application No. 202.

Built by county, macadam, 1.11 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	923 24
Labor, including hauling (average length of haul, 2 miles).....	1,613 27
Stone.....	2,524 67
Rolling, including sprinkling.....	160 00

Total cost.....	\$5,233 18
State reward.....	1,110 00

Cost to county.....	\$4,123 18
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Buena Vista Township, Application No. 203.

Built by county, macadam, 1.072 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$15 88
Grading.....	693 40
Labor, including hauling (average length of haul, 1 1/4 miles).....	1,018 92
Stone.....	2,298 81
Rolling, including sprinkling.....	215 00
Culverts.....	23 10

Total cost.....	\$4,265 11
State reward.....	1,072 00

Cost to county.....	\$3,193 11
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Buena Vista Township, Application No. 291.

Built by county, macadam, 1.097 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	576 83
Labor, including hauling (average length of haul, 2 miles).....	1,453 26
Stone.....	2,458 61
Rolling, including sprinkling.....	150 00
Concrete culvert.....	375 00
Other expenses.....	8 00

Total cost.....	\$5,033 70
State reward.....	1,097 00

Cost to county.....	\$3,936 70
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Carrollton Township, Application No. 32.

Built by county, gravel, 1.11 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	700 00
Labor, including hauling (average length of haul, 1½ miles).....	1,077 31
Gravel.....	1,731 15
Rolling, including sprinkling.....	120 00

Total cost.....	\$3,652 46
State reward.....	555 00

Cost to county.....	\$3,097 46
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Carrollton Township, Application No. 176.

Built by county, macadam, .594 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	225 00
Labor, including hauling (average length of haul, 3 miles).....	810 90
Stone.....	1,163 58
Rolling, including sprinkling.....	78 00

Total cost.....	\$2,289 48
State reward.....	594 00

Cost to county.....	\$1,695 48
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Carrollton and Kochville Townships, Application No. 289.

Built by county, macadam, .493 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	117 64
Labor, including hauling (average length of haul, 3½ miles).....	699 12
Stone.....	1,104 69
Rolling, including sprinkling.....	69 50

Total cost.....	\$2,002 95
State reward.....	493 00

Cost to county.....	\$1,509 95
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Chesaning Township, Application No. 154.

Built by township, macadam, 1 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$29 00
Grading.....	480 00
Labor, including hauling (average length of haul, $\frac{3}{4}$ mile).....	752 01
Stone.....	1,779 69
Rolling, including sprinkling.....	100 00

Total cost.....	\$3,140 70
State reward.....	1,000 00
Cost to township.....	\$2,140 70

Frankenmuth Township, Application No. 288.

Built by county, macadam, 1.017 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$30 20
Grading.....	766 00
Labor, including hauling (average length of haul, $1\frac{1}{2}$ miles).....	860 09
Stone.....	2,222 92
Rolling, including sprinkling.....	140 00

Total cost.....	\$4,019 21
State reward.....	1,017 00
Cost to county.....	\$3,002 21

James Township, Application No. 126.

Built prior to December 1st, 1906, by county, .41 mile macadam.

Cost to county.....	\$1,144 00
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James Township, Application No. 126.

Built by county, macadam, .734 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	260 00
Labor, including hauling (average length of haul, $\frac{1}{2}$ mile).....	446 23
Stone.....	1,087 47
Rolling, including sprinkling.....	78 53
Culvert.....	18 57
Coal.....	24 00

Total cost.....	\$1,926 80
State reward.....	734 00
Cost to county.....	\$1,192 80

James Township, Application No. 292.

Built by county, macadam, .99 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	616 24
Labor, including hauling (average length of haul, $\frac{1}{2}$ mile).....	640 88
Stone.....	2,161 45
Rolling, including sprinkling.....	120 00

Total cost.....	\$3,550 57
State reward.....	990 00
Cost to county.....	\$2,560 57

Jonesfield Township, Application No. 218.

Built by county, macadam, .754 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey.....	\$19 77
Grading.....	350 00
Labor, including hauling (average length of haul, 1 mile).....	552 55
Stone.....	1,605 50
Rolling, including sprinkling.....	88 11
Coal.....	18 00
Freight.....	31 05
Total cost.....	\$2,664 98
State reward.....	754 00
Cost to county.....	\$1,910 98

Jonesfield Township, Application No. 286.

Built by township, macadam, 1.985 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$42 00
Grading.....	667 00
Labor, including hauling (average length of haul, 1½ miles).....	2,473 97
Stone.....	4,474 51
Rolling, including sprinkling.....	270 00
Total cost.....	\$7,927 48
State reward.....	1,985 00
Cost to township.....	\$5,942 48

Kochville Township, Application No. 33.

Built prior to December 1st, 1906, by county, .497 mile, macadam.

Cost to county.....	\$1,829 76
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Kochville Township, Application No. 79.

Built prior to December 1st, 1906, by county, .497 mile, macadam.

Cost to county.....	\$1,829 76
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Kochville Township, Application No. 206.

Built by county, macadam, .995 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	429 87
Labor, including hauling (average length of haul, 5 miles).....	1,960 26
Stone.....	2,286 36
Rolling, including sprinkling.....	205 00
Coal.....	106 21
Culverts.....	162 34
Total cost.....	\$5,162 04
State reward.....	995 00
Cost to county.....	\$4,167 04

Hersey Township, Application No. 326.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$11 50
Grading.....	622 26
Labor, including hauling (average length of haul, 1 mile).....	560 74
Gravel, 1500 cubic yards at 5c per cubic yard.....	75 00
Rolling, including sprinkling.....	50 00
Culverts.....	135 00
Total cost.....	<u>\$1,454 50</u>
State reward.....	500 00
Cost to township.....	<u>\$954 50</u>

Hersey Township, Application No. 413.

Built by township, gravel, .156 mile, width of gravel 9 feet.	
Grading.....	\$100 00
Labor, including hauling (average length of haul, 1 ½ miles).....	100 50
Gravel, 215 cubic yards at 5c per cubic yard.....	10 75
Rolling, including sprinkling.....	5 00
Other expenses.....	10 00
Total cost.....	<u>\$226 25</u>
State reward.....	78 00
Cost to township.....	<u>\$148 25</u>

Marion Township, Application No. 253.

Built by township, gravel, 2.008 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$29 18
Grading.....	1,921 98
Labor, including uncovering gravel pit and hauling (average length of haul, 1 ½ miles).....	1,934 14
Gravel, 3,029 cubic yards; 1,708 cubic yards at 10c, balance from township pit.	170 80
Rolling, including sprinkling.....	16 10
Culverts.....	114 08
Blacksmithing.....	7 45
Hardware bill—shovels, grub-hoes, dynamite, coal-shutes, bolts and repairs.....	34 46
Livery bill.....	1 50
Total cost.....	<u>\$4,229 69</u>
State reward.....	1,004 00
Cost to township.....	<u>\$3,225 69</u>

Orient Township, Application No. 153.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$11 00
Grading.....	270 00
Labor and gravel.....	1,227 09
Rolling, including sprinkling.....	5 00
Other expenses.....	30 00
Total cost.....	<u>\$1,543 09</u>
State reward.....	500 00
Cost to township.....	<u>\$1,043 09</u>

Saginaw Township, Application No. 31.

Built prior to December 1st, 1906, by county, 1.07 miles, macadam.

Cost to county.....	\$2,630 00
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Saginaw Township, Application No. 175.

Built by county, macadam, .99 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$15 00
Grading.....	492 22
Labor, including hauling (average length of haul, 2½ miles).....	1,304 03
Stone.....	2,379 27
Rolling, including sprinkling.....	172 00
Culverts.....	18 69
Coal.....	24 50

Total cost.....	\$4,405 71
State reward.....	990 00

Cost to county.....	\$3,415 71
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Saginaw Township, Application No. 217.

Built by county, macadam, .56 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$7 25
Grading.....	252 47
Labor, including hauling (average length of haul, 1½ miles).....	627 12
Stone.....	1,110 61
Rolling, including sprinkling.....	76 15
Coal.....	10 50
Culvert.....	7 53

Total cost.....	\$2,091 63
State reward.....	560 00

Cost to county.....	\$1,531 63
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Saginaw Township, Application No. 227.

Built by county, macadam, .191 mile, width of macadam 10 feet.

Engineering expenses, including cost of survey and profile.....	\$9 00
Grading.....	47 99
Labor, including hauling (average length of haul, 2½ miles).....	320 26
Stone.....	417 23
Rolling, including sprinkling.....	31 27
Coal.....	6 90

Total cost.....	\$832 65
State reward.....	191 00

Cost to county.....	\$641 65
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Birch Run Township, Application No. 411.

Built by county, macadam, 509 mile.

Engineering expenses, including cost of survey and profile..... \$12 00

Grading, estimated..... 200 00

Labor, including hauling (average length of haul, $\frac{1}{4}$ mile) 447 45

Stone..... 1,435 13

Rolling, including sprinkling..... 80 00

Total cost..... \$2,174 58

State reward..... 509 00

Cost to county..... \$1,665 58

Blumfield Township, Application No. 293.

Built by county, macadam, 1,015 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile..... \$12 00

Grading..... 600 00

Labor, including hauling (average length of haul, $1\frac{1}{4}$ miles)..... 1,435 06

Stone..... 2,439 88

Rolling, including sprinkling..... 150 00

Total cost..... \$4,636 94

State reward..... 1,015 00

Cost to county..... \$3,621 94

Bridgeport and Spaulding Townships, Application No. 35.

Built prior to December 1st, 1906, by county, $1\frac{1}{4}$ miles, macadam.

Cost to county..... \$2,875 00

Bridgeport Township, Application No. 124.

Built by county, macadam, 1,604 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile..... \$33 00

Grading..... 675 00

Labor, including hauling..... 1,649 61

Stone..... 3,618 66

Rolling, including sprinkling..... 130 00

Coal..... 40 55

Total cost..... \$6,146 82

State reward..... 1,604 00

Cost to county..... \$4,542 82

Bridgeport and Spaulding Townships, Application No. 205.

Built by county, macadam, .99 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile..... \$12 00

Grading..... 499 69

Labor, including hauling..... 1,009 99

Stone..... 2,368 09

Rolling, including sprinkling..... 160 00

Total cost..... \$4,049 77

State reward..... 990 00

Cost to county..... \$3,059 77



A state reward macadam road in Bay county, built of limestone by county road commission. The pioneer good roads county of Michigan. This county is noted for its good farms, good coal and good roads.

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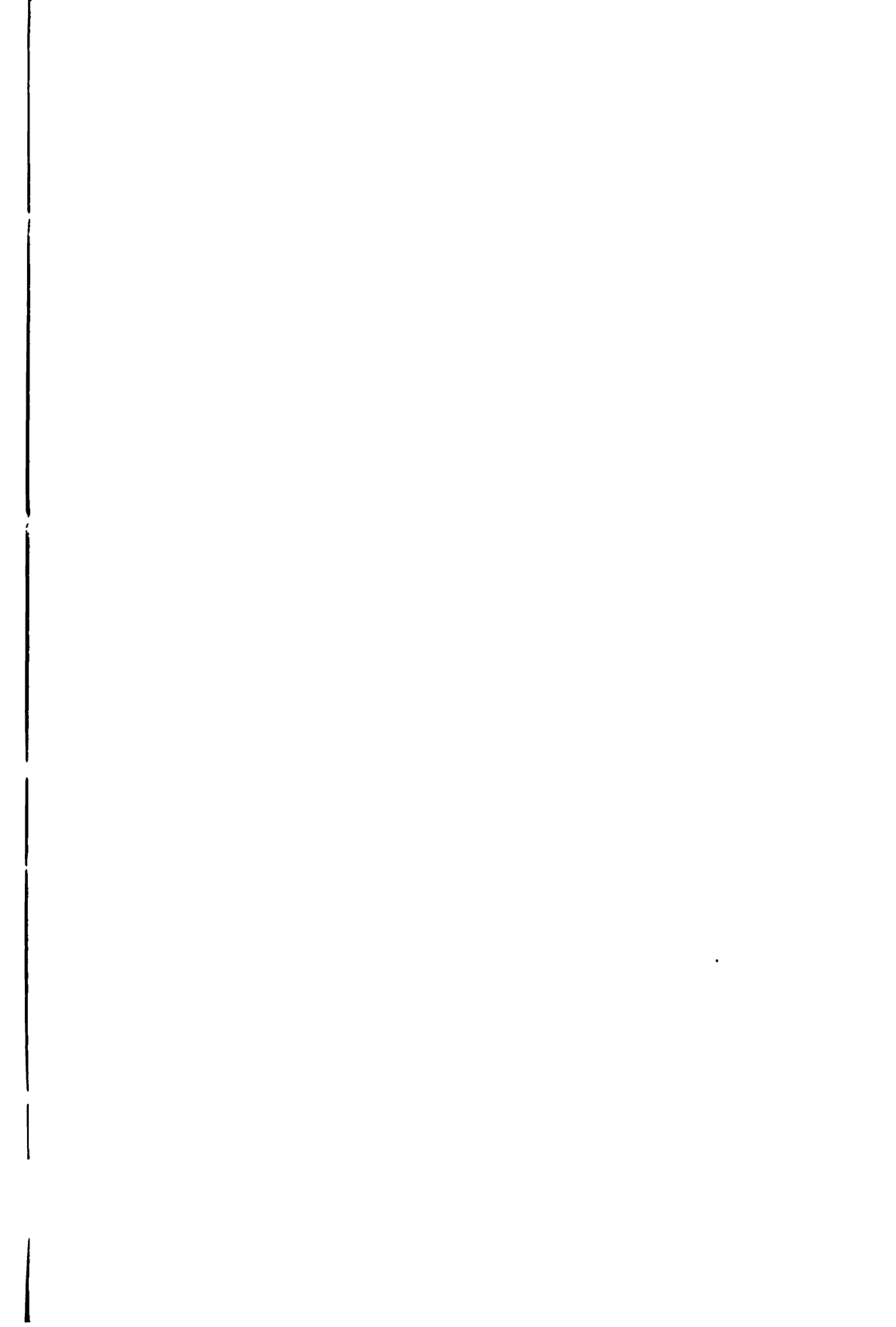
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Bridgeport Township, Application No. 226.

Built by county, macadam, .068 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$2 00
Grading.....	30 60
Labor, including hauling.....	103 03
Stone.....	153 83
Total cost.....	\$289 46
State reward.....	68 00
Cost to county.....	\$221 46

Bridgeport and Spaulding Townships, Application No. 294.

Built by county, macadam, 2.11 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	1,317 40
Labor, including hauling (average length of haul, 1½ mile).....	1,908 51
Stone.....	4,822 87
Rolling, including sprinkling.....	320 00
Total cost.....	\$8,392 78
State reward.....	2,110 00
Cost to county.....	\$6,282 78

Buena Vista and Saginaw Townships, Application No. 2.

Built prior to December 1st, 1906, by county, 2 miles, macadam.	
Cost to county.....	\$4,860 00

Buena Vista Township, Application No. 36.

Built prior to December 1st, 1906, by county, 1.043 miles, macadam.	
Cost to county.....	\$3,514 00

Buena Vista Township, Application No. 37.

Built prior to December 1st, 1906, by county, .974 mile, macadam.	
Cost to county.....	\$2,906 00

Buena Vista Township, Application No. 37.

Built by county, macadam, ¼ mile, width of macadam, 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$3 00
Grading.....	100 00
Labor, including hauling.....	369 98
Stone.....	606 11
Rolling, including sprinkling.....	40 00
Total cost.....	\$1,119 09
State reward.....	250 00
Cost to county.....	\$869 09

Buena Vista Township, Application No. 125.

Built by county, macadam, 1.063 miles, width of macadam, 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$30 00
Grading.....	680 00
Labor, including hauling.....	1,282 00
Stone.....	1,968 30
Tile drain.....	240 00
Concrete culverts.....	300 00
Total cost.....	\$4,500 30
State reward.....	1,063 00
Cost to county.....	\$3,437 30

Buena Vista Township, Application No. 201.

Built by county, macadam, .92 mile, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	530 04
Labor, including hauling (average length of haul, 1 ½ miles).....	1,300 88
Stone.....	2,490 46
Rolling, including sprinkling.....	140 00
Total cost.....	\$4,473 38
State reward.....	920 00
Cost to county.....	\$3,553 38

Buena Vista Township, Application No. 202.

Built by county, macadam, 1.11 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	923 24
Labor, including hauling (average length of haul, 2 miles).....	1,613 27
Stone.....	2,524 67
Rolling, including sprinkling.....	160 00
Total cost.....	\$5,233 18
State reward.....	1,110 00
Cost to county.....	\$4,123 18

Buena Vista Township, Application No. 203.

Built by county, macadam, 1.072 miles, width of macadam 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$15 88
Grading.....	693 40
Labor, including hauling (average length of haul, 1 ½ miles).....	1,018 92
Stone.....	2,298 81
Rolling, including sprinkling.....	215 00
Culverts.....	23 10
Total cost.....	\$4,265 11
State reward.....	1,072 00
Cost to county.....	\$3,193 11

Buena Vista Township, Application No. 291.

Built by county, macadam, 1.097 miles, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	576 83
Labor, including hauling (average length of haul, 2 miles).....	1,453 26
Stone.....	2,458 61
Rolling, including sprinkling.....	150 00
Concrete culvert.....	375 00
Other expenses.....	8 00

Total cost.....	\$5,033 70
State reward.....	1,097 00
Cost to county.....	\$3,936 70

Carrollton Township, Application No. 32.

Built by county, gravel, 1.11 miles, width of gravel 9 feet.

Engineering expenses, including cost of survey and profile.....	\$24 00
Grading.....	700 00
Labor, including hauling (average length of haul, 1½ miles).....	1,077 31
Gravel.....	1,731 15
Rolling, including sprinkling.....	120 00

Total cost.....	\$3,652 46
State reward.....	555 00
Cost to county.....	\$3,097 46

Carrollton Township, Application No. 176.

Built by county, macadam, .594 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	225 00
Labor, including hauling (average length of haul, 3 miles).....	810 90
Stone.....	1,163 58
Rolling, including sprinkling.....	78 00

Total cost.....	\$2,289 48
State reward.....	594 00
Cost to county.....	\$1,695 48

Carrollton and Kochville Townships, Application No. 289.

Built by county, macadam, .493 mile, width of macadam 9 feet.

Engineering expenses, including cost of survey and profile.....	\$12 00
Grading.....	117 64
Labor, including hauling (average length of haul, 3½ miles).....	699 12
Stone.....	1,104 69
Rolling, including sprinkling.....	69 50

Total cost.....	\$2,002 95
State reward.....	493 00
Cost to county.....	\$1,509 95

Millington Township, Application No. 319.

Built by township, gravel, .312 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$6 00
Grading.....	103 00
Labor, including hauling (average length of haul, 2½ miles).....	457 00
Gravel.....	31 15
Rolling, including sprinkling.....	10 00
Concrete bridge.....	198 00
Total cost.....	\$805 15
State reward.....	156 00
Cost to township.....	\$649 15

VAN BUREN COUNTY.

Geneva Township, Application No. 249.

Built by township, gravel, 1 mile, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile.....	\$10 00
Grading.....	97 00
Labor, including hauling (average length of haul, 3½ miles).....	1,570 00
Gravel.....	250 00
Total cost.....	\$1,927 00
State reward.....	500 00
Cost to township.....	\$1,427 00

WAYNE COUNTY.

Ecorse Township, Application No. 372.

Built by county, macadam, 1.784 miles, width of macadam 15 feet.	
Built by contract, contract price (F. Porath & Son, Detroit, contractors)	\$10,000 00
Advertisements and miscellaneous.....	29 72
Bridge and abutments.....	1,247 91
Inspection.....	219 00
Ditching and drains.....	217 06
Total cost.....	\$11,713 69
State reward.....	784 00
Cost to county.....	\$10,929 69

Gratiot and Hamtramck Townships, Application No. 318.

Built by county, macadam, .672 mile, width of macadam 16 feet.	
Built by contract, contract price (F. Porath & Son, Detroit, contractors)	\$10,141 00
Repairs to road before starting work.....	43 33
Repairs to bridge.....	147 14
Ditching and tiling.....	311 28
Inspection.....	263 18
Miscellaneous.....	35 50
Total cost.....	\$10,941 43
State reward.....	672 00
Cost to county.....	\$10,269 43

Greenfield Township, Application No. 340.

Built by county, macadam, 1.643 miles, width of macadam 16 feet.	
Labor, including grading and hauling (average length of haul, 2½ miles)	\$6,122 82
Limestone, 88½¢ per ton, cobblestone, \$1.87½¢ per ton	10,120 91
Rolling, including sprinkling	676 65
Culvert	235 25
Guard-rail	49 00
Ditching and tiling	983 85
Cutting weeds	17 80
Coal	470 19
Telephone	25 00
Tar	704 52
Total cost	\$19,405 99
State reward	1,643 00
Cost to county	\$17,762 99

Hamtramck Township, Application No. 312.

Built by county, macadam, 1.07 miles, width of macadam 15 feet.	
Labor, including grading and hauling (average length of haul, 1 mile)	\$3,023 15
Limestone	3,876 78
Cobblestone	2,986 48
Rolling, including sprinkling	377 72
Ditching and tiling	531 00
Coal	94 00
Tar	469 09
Total cost	\$11,358 22
State reward	1,070 00
Cost to county	\$10,288 22

Monguagon Township, Application No. 390.

Built by county, macadam, .947 mile, width of macadam 15 feet.	
Labor, including hauling (average length of haul, 1½ miles)	\$1,385 96
Stone	2,089 18
Rolling, including sprinkling	872 90
Bridge	1,240 52
Drainage	171 58
Miscellaneous	27 10
Total cost	\$5,787 24
State reward	947 00
Cost to county	\$4,840 24

WEXFORD COUNTY.

Henderson Township, Application No. 402.

Built by township, gravel, 1.002 miles, width of gravel 9 feet.	
Engineering expenses, including cost of survey and profile	\$437 50
Grading	850 00
Labor, including hauling (average length of haul, 1 mile)	750 00
Rolling	23 50
Total cost	\$1,667 00
State reward	501 00
Cost to township	\$1,166 00

SUMMARY OF COSTS AND STATE REWARD EARNED ON 301.348 MILES OF ROAD.

	Total cost of roads.	State reward earned.
Allegan county.....	\$2,471 90	\$750 00
Antrim county.....	18,981 91	5,051 00
Barry county.....	3,593 00	1,678 00
Bay county.....	36,188 34	14,017 00
Benzie county.....	5,356 72	1,502 00
Berrien county.....	63,559 50	12,851 00
Calhoun county.....	6,646 99	2,169 00
Cheboygan county.....	12,462 96	3,815 00
Clare county.....	3,185 00	1,000 00
Delta county.....	17,537 75	4,000 00
Dickinson county.....	43,968 64	7,925 00
Eaton county.....	6,038 96	2,799 00
Grand Traverse county.....	1,339 98	540 00
Gratiot county.....	15,401 72	7,762 00
Huron county.....	20,005 91	6,152 00
Ingham county.....	17,254 35	3,000 00
Iosco county.....	8,980 03	2,428 00
Isabella county.....	2,845 40	1,000 00
Jackson county.....	14,235 55	2,500 00
Kalkaska county.....	30,902 78	7,322 00
Kent county.....	29,370 20	6,800 00
Lake county.....	1,110 84	500 00
Macomb county.....	12,178 40	2,000 00
Manistee county.....	55,792 56	8,717 00
Marquette county.....	47,768 54	7,073 00
Mason county.....	39,870 46	10,910 00
Mecosta county.....	5,845 76	1,978 00
Menominee county.....	20,336 73	7,306 00
Monroe county.....	2,940 00	1,000 00
Montcalm county.....	3,712 04	1,750 00
Muskegon county.....	39,724 71	9,647 00
Oakland county.....	3,919 81	1,040 00
Oceana county.....	31,288 29	9,999 00
Osceola county.....	12,409 92	3,582 00
Saginaw county.....	168,579 55	42,239 00
Sanilac county.....	3,350 00	1,000 00
St. Clair county.....	34,186 16	7,736 00
Shiawassee county.....	1,125 26	500 00
Tuscola county.....	32,606 08	10,018 00
Van Buren county.....	1,927 00	500 00
Wayne county.....	59,206 57	5,116 00
Wexford county.....	1,667 00	501 00
	\$954,363 33	\$228,215 00

Cost of clay-gravel roads.....	\$804 80	State reward	\$250 00
Cost of gravel roads.....	262,977 52	" "	70,470 00
Cost of stone-gravel roads.....	5,230 74	" "	2,725 00
Cost of gravel-stone roads.....	3,429 39	" "	1,934 00
Cost of macadam roads.....	681,920 88	" "	152,836 00

The average cost of macadam roads per mile where the macadam is nine feet wide, has been \$3,749. The average cost of gravel roads, where the gravel is put on nine feet wide, has been \$1,678 per mile.

EXPENSES OF DEPARTMENT.

From December 1, 1906, to November 30, 1908.

PAID FROM APPROPRIATION.

Salaries.....	\$12,682 01
Traveling expenses:	
H. S. Earle.....	1,250 58
F. F. Rogers.....	2,019 63
Lettie J. Brown.....	6 89
J. V. Gongwer.....	7 18
C. H. Baxter.....	140 94
Postage.....	1,700 00
Printing.....	947 39
Stationery.....	334 35
Express and cartage.....	87 34
Paper.....	415 61
Typewriter.....	124 03
Engraving.....	107 87
Telegraph.....	19 96
Telephone.....	116 70
Gazeteer.....	7 00
Total, two years.....	\$19,967 48

SALARIES.

Paid to	At rate of
Horatio S. Earle.....	\$2,500 00 per annum.
Frank F. Rogers.....	1,800 00 per annum.
Lettie J. Brown.....	1,200 00 per annum.
J. V. Gongwer.....	75 00 per month, or 30c per hour.
Irene McCarthy.....	2 00 per day.
Mrs. Mable Standish.....	1 00 per day when employed.

PAID FROM MOTOR VEHICLE FUND.

Report, part payment.....	\$402 64
Engravings and photos.....	35 52
Stereopticon and slides.....	47 30
Western Union.....	60
American express.....	8 89
Paper.....	37 33
Printing.....	47 46
Traveling expenses and per diem:	
*Robert Alexander.....	308 11
†F. H. Baker.....	139 05
*M. W. Baker.....	74 35
*Leslie H. Belknap.....	286 48
†John Bradford.....	397 37
†L. J. Brown.....	10 38
*Frank L. Buell.....	137 15
*Isaac H. Church.....	77 00
*Robert W. Cole.....	185 11
*Charles Conklin.....	102 25
*J. Frank Cook.....	203 76
*W. M. Derusha.....	125 31
†H. S. Earle.....	336 28
*Wm. H. Ewing.....	231 80
*T. A. Farrand.....	153 77

STATE HIGHWAY DEPARTMENT

*W. J. Fowler.....	\$83 79
*R. A. Garber.....	455 75
*Wm. H. Gardner.....	81 24
*John I. Gibson.....	11 20
*Harvey D. Griswold.....	181 25
*Charles F. Hall.....	223 50
*Frank G. Hood.....	418 03
*W. W. Ingram.....	44 85
*Elmer Kimball.....	96 58
*Henry Kurtz.....	106 75
*W. A. Leeke.....	121 16
*A. L. Lowry.....	154 33
*Geo. Martin.....	73 90
*F. I. Meryman.....	97 00
*Henry M. Miller.....	209 05
*Henry W. Mitchell.....	134 42
*Myron Moak.....	393 75
*D. W. Morrison.....	481 20
*Dugald McGregor.....	38 27
*D. H. McMullen.....	38 50
†John H. Parks.....	47 11
*Fred N. Patterson.....	104 88
*P. B. Reynolds.....	191 25
*F. E. Rice.....	192 68
*George E. Rowe.....	429 90
*Ward V. Sanford.....	99 00
*Charles B. Scully.....	132 24
*E. A. Shults.....	99 24
*George B. Smith.....	46 14
*Eugene H. Swain.....	229 70
*C. C. Terwilliger.....	16 75
*Sanford L. Utley.....	209 25
*W. M. Wissing.....	122 50
*A. F. Wright.....	117 00

\$8,830 07

*Paid at rate of \$3.00 per day while employed in securing signatures to petitions for the submission of the question of adopting the county road system in counties not under that system.

† Paid at rate of \$3.00 per day while assisting in holding county road institutes.

‡ Traveling expenses in attending farmers' institutes and good roads meetings.

STANTON GRAVEL ROAD.

(Stanton Weekly Clipper, December 4th, 1908.)

The Stanton gravel road, which was recently completed from the city limits west 2 1-2 miles, is a state reward road known as class "B," which means a road graded according to specifications provided by state law and having two courses of gravel eight inches in thickness after it is thoroughly compacted by rolling with a heavy roller.

This road was turnpiked twenty feet wide, the center of which is gravel nine feet wide. There were about 4,300 cubic yards, or loads, of gravel put on the road.

The road was built by the Good Roads Association. This organization was formed at a good roads meeting held at Corey's hall, on the afternoon of September 26, which was attended by a number of our citizens, several farmers and State Highway Commissioner H. S. Earle of Detroit. At this meeting an executive committee was appointed consisting of Mayor M. W. Stevenson, D. A. Towle, secretary, P. J. Devine, treasurer, E. O. Bellows and E. C. Lowry. A soliciting committee was also appointed consisting of Charles L. Meach, Martin Morgan and Thomas Crooks. At the same meeting over one-half of the amount necessary to build the road was subscribed and the Stanton gravel road was assured.

Many predicted the road could not possibly be built until next season, but those who were in earnest thought differently. In less than a week after the meeting was held the surveyor had completed the work of surveying the road and a few days afterward a road was built to the gravel pit owned by Fred Pakes, who donated the gravel. The first load of gravel was hauled on October 23 and nineteen days later the work of graveling was completed. About 4,000 loads were hauled an average distance of two miles. A few days were required rolling the gravel, cleaning out the gutters, etc. The road was built from start to finish in just twenty-eight days.

The total cost of the road was a little over \$2,800, or two or three hundred dollars less than the estimated cost. The amount was raised by donations from the people of Stanton and farmers west of town.

John Waters of Hastings, an experienced road builder, had charge of the work.

The road was inspected by State Highway Commissioner Earle on November 20, who pronounced it one of the best pieces of road work, and completed in the shortest time, ever done in Michigan. The state will pay \$500 per mile reward for the construction of the road. This amount was advanced by a number of our business men until it is received by the association from the state.

SUBSCRIPTION ROADS.

The first subscription road built after modern plans and specifications, was built at Port Huron in 1900 under the supervision of Col. E. G. Harrison, a road expert at that time employed by the Road Inquiry Department at Washington.

Several miles of gravel and macadam roads have since been built with funds raised by subscription. I desire to mention a few.

Hon. Philip T. Colgrove of Hastings, has each year since the state reward road law was passed, raised by subscription enough labor and money, together with the state reward, to build a mile or more of road in Rutland township adjoining Hastings city.

He not only has been the moving spirit in raising the money, but he has spent a good deal of his valuable time in superintending the actual construction.

At first it was up-hill work for him to overcome the antagonism to good roads, because the opposition could not see any benefit to be derived only by automobiles, but they have experienced a change of heart and he now has the earnest co-operation of the farmers of Rutland township.

A number of public spirited citizens of Stanton held a mass meeting the 26th day of September, 1908, and started a subscription for road building. The 20th of November two miles of fine gravel road had been built west of the city, for which they received \$1,250 of state reward.

Battle Creek Industrial Association promoted a good gravel road out toward Beadle Lake, laying it across sections, shortening the distance and dodging the hills to an important farming section. The farmers donated labor and the business men, money, and the state \$500 a mile reward.

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State reward gravel road between Douglas and Sidney townships, Montcalm county. Built by Stanton Good Roads Association.



State reward gravel road, Emmet township, Calhoun county.

MENTHA ROADS.

The A. M. Todd Co., of Kalamazoo, is building eight miles of gravel road in Pine Grove township, Van Buren County at the expense of the company. They are proud of their success in road building as they may well be, considering the difficulty in establishing a good bottom for a road built in soil the nature of this. It has been but a few years since Mentha was an undeveloped swamp, and the photograph shows as plainly as anything can, what can be done in the line of road building if efforts are properly directed. Mentha is the center of the greatest peppermint region in the United States.

OPINION OF ATTORNEY GENERAL.

The Attorney General has given the following opinion in reply to inquiry regarding:

"What disposition shall be made of money received by townships and counties in state reward for improving roads?"

"The title to act 146 states that the act is to 'provide for a system of state co-operation with townships and counties in the improvement of public wagon roads and to make an appropriation therefor.' Section 11 contains the proviso that, 'in case the road building money was raised by the sale of bonds, the state reward money shall be used only for the payment of the principal of the bonds.' Although the money to be paid by the state is spoken of in the act as a reward, it seems to us clear from the title of the act and the terms of payment of the money that it was the intention of the legislature that this money should be used for road purposes."

STATE AID.

What Michigan is offering her rural districts in the shape of state aid for good roads is like a clover seed in comparison with a load of hay when one considers what New York is doing along that line.

Michigan gives nothing for repair, \$500 a mile toward the cost of building gravel roads which cost on the average \$1,300 a mile, and \$1,000 a mile toward the cost of macadam roads costing on the average \$4,000 a mile.

New York under the Fuller-Plank Act gives the township fifty cents for every dollar they raise in cash for repair work; and under the Higbee-Armstrong Act one-half the cost of building state aid gravel and stone roads, and under the new act passed in 1908 has undertaken the building of 3,332 miles of macadam road, paying the entire cost out of the state treasury and forever keeping this amount of road in repair.

STATES THAT AID AMOUNTS APPROPRIATED

States.	Law adopted.	Total state appropriations.	Present annual state appropriation.	Paid by state.	Paid by county.
New Jersey.....	1891	\$2,475,441	\$300,000	33½ %	56½ %
Massachusetts...	1892	d9,250,000	{ Average 486,842 }	75 %	25 %
Vermont.....	1892	960,000	{ 50,000 special 100,000 regular }	{ 50 % 100 % }	
Connecticut.....	1895, 1907	4,500,000	750,000	75 or 87½ %	
California... a..	b1895, 1907	426,630	49,250	100 %	
New York.....	1898	e14,223,265	1908, 3,000,000	{ 100 % for state roads 50 % ½ to 4-7 }	{ County roads 35 % }
Maine.....	1901, c1908	456,577	131,577		
Rhode Island...	1902, c1908	1,035,000	{ 125,000 Bonded 1906 600,000 }	100 %	
New Hampshire	1905	500,000	125,000	About 46 %	
Pennsylvania.. {	1903 Am.				
	1905, 1907	7,500,000	1,250,000	75 %	12½ %
Delaware.....	1905	60,000	30,000	50 %	50 %
Illinois.....	1903	100,000	{ 25,000 for expenses.	f Stone free	
Maryland.....	1904	600,000	200,000	50 %	50 %
Ohio..... {	Ame'd 1908	440,000	440,000	50 %	25 %
Iowa.....	1904	14,000	{ Educational 3,500 15,000 Private sub. 15,000 }		
Idaho.....		{ Fire has destroyed records }			
Minnesota.....	1905	127,000	72,500	33½ %	66½ %
Washington.....	1905	460,000	{ 112,500 67,500 }	{ 100 % 50 % }	50 %
Michigan.....	1905	{ 360,000 and auto fund 18,000 Including 1909 329,800 }	160,000	g \$250 to 1,000 a mile.	{ Balance if built by county }
Virginia.....	1906		99,800	50 %	50 %
Colorado.....			75,000	100 %	
Missouri.....	1907	500,000		100 %	
New Mexico....	1903	40,931	6,821	{ State gives labor of convicts }	
Oklahoma.....					
Wisconsin.....	1907	20,000	{ 10,000 education and demon's'tion }	Constitution amended to per- mit of state aid 1908.	

a Los Angeles county, California, has bonded for \$3,500,000 to build permanent roads.

b Repealed.

c New law.

d Including appropriation of \$2,500,000 covering period of five years beginning 1908.

IN ROAD BUILDING.
AND PROPORTIONS PAID.

Paid by township.	Miles of road improved by state aid.	Total road mileage of state.	Number of commissioners.	Salary per year.	Population of state.	Assessed valuation of state.
10%	1,380	14,900	1	\$5,000	2,144,134	.....
.....	750	20,000	3	{ 5,000 4,000 4,000 }	3,003,680	\$3,626,656,503
50%	.....	14,996	1	1,800	343,641	202,181,560
Balance	600	15,000	1	5,000	908,420	1,343,499,114
.....	.....	50,000	1 Eng.....	4,800	1,900,000	.....
15%	1,700	76,000	3	{ 6,000 5,000 5,000 }	7,500,000	7,000,000,000
Balance	455	25,528	1	2,500	729,189	446,100,000
.....	172	2,240	5	Each 500	484,766	496,614,025
Balance	240	15,116	1 Eng....	3,000	411,588	304,262,911
12½%	725	99,041	1	6,500	6,302,115	{ Real estate 4,001,521,903 }
.....	21	3,000	1	1,000	184,735	79,457,000
{ Free stone for 110 }	{ 110 }	94,141	{ 3 1 Eng. }	.....	4,821,550	6,317,737,915
.....	.....	16,733	1 .....	.....	1,190,050	.....
{ Twp. 15% Abutter 10% }	69	80,000	1	2,500	4,157,545	2,239,786,903
.....	.....	102,448	1 Eng....	1,800	2,231,853	.....
.....	70	16,163	3 .....	.....	518,103	.....
.....	100	79,300	{ 3 1 Eng. }	1,800	1,751,394	1,000,000,000
.....	182	31,998	1	2,500	1,000,000	748,593,942
{ Balance if built by township }	326	67,979	1	2,500	2,530,016	1,734,100,000
.....	75	52,000	4 .....	.....	1,854,184	.....
.....	65	.....	.....	.....	539,700	.....
{ Nothing doing }	30	.....	.....	.....	3,106,665	.....
.....	.....	.....	.....	.....	500,000	52,389,825
.....	.....	.....	.....	.....	1,414,177	728,507,373
.....	.....	.....	.....	.....	2,228,949	2,478,561,786

e Bonded for \$50,000,000 and \$11,000,000 of money appropriated is proceeds of sale of bonds, hence a balance of \$39,000,000 yet to appropriate.

f Gave 125,000 cubic yards of convict crushed stone to townships and counties.

g Less than 25 % of the cost.

COUNTY ROAD SYSTEM.

AN ACT to provide for a county and township system of roads, and to prescribe the powers and duties of the officers having the charge thereof.

(P. A. 1893, Act 149, as amended by Act No. 82, P. A. 1907.)

The People of the State of Michigan enact:

SECTION 1. On petition of not less than ten freeholders residing in each of the several organized townships, incorporated villages and cities, of any county, or upon a majority vote of the members of the board of supervisors, the board of supervisors of such county shall submit the question of adopting the county road system to a vote of the electors of such county. The said board of supervisors may submit the question at a general or special election called for that purpose, but they shall submit it not later than at the next general election. The following form of resolution shall be sufficient for submitting the question viz.: "Resolved, that the question of adopting the county road system be submitted to a vote of the electors of the county of..... at (the general or special election) to be held on the day of....., nineteen hundred....." If a special election is to be called, a clause added to the resolution in form following shall be sufficient for that purpose, viz.: "And a special election is hereby called to be held in the several townships (and wards) of said county on the day last aforesaid, for the purpose of taking such vote."

SEC. 2. At least three weeks shall intervene between the adoption of the resolution by the board of supervisors and the time of holding such election. After the adoption of the resolution by the board of supervisors, the county clerk shall give notice thereof. Such notice shall be addressed to the electors of the county and shall set forth the action of the board of supervisors together with a copy of the resolution, and shall further give notice that said question will be stated upon the ballot to be used at said election, as follows: "Shall the county road system be adopted by the county of.....?" Said notice may be in the form following, viz.:

"To the electors of the county of....."

"Notice is hereby given that at a meeting of the board of supervisors of said county, held on the..... day of..... 19...., the following resolution was adopted, viz.: (here set forth the resolution).

"Notice is further given that said question will be stated on the ballots to be used at said election, as follows: 'Shall the county road system be adopted by the county of.....?'"

"Dated....."

"....."

"Clerk of the County of.....".



Gravel road in the greatest peppermint region in the United States. Road built by Hon. A. M. Todd of Kalamazoo.



Macadam road in fruit belt of Michigan, St. Joseph township, Berrien county.

SEC. 3. Said clerk shall cause such notice, printed in the form of a handbill, to be posted in three or more public places in each township and ward of such county, at least two weeks before the time of such election, and also to be published in such newspaper or newspapers published and circulated in said county as the board of supervisors may direct, once in each week for at least two weeks before said election. Proof of the posting and publication of such notice may be made by affidavit of any person or persons knowing the facts, and be filed in the office of said clerk and shall be recorded in the records of the proceedings of the board of supervisors. Such affidavit or the record thereof, or a certified copy of such affidavit or the record thereof, shall be prima facie evidence of the facts stated therein. Ballots shall be prepared and distributed by the same officers prescribed by law for general elections. The question shall be stated on such ballots as follows, viz.: "Shall the county road system be adopted by the county of.....?" and immediately below and on different lines shall be printed the word "Yes" and the word "No." At the time mentioned in such resolution such election shall be held and the vote taken accordingly.

SEC. 4. If upon the canvass of the votes cast at such election it shall appear that the majority is in favor of the adoption thereof, then the county road system shall be considered as adopted in such county, and thereupon the provisions of this act and all other acts relative to such system shall be and become operative in such county.

SEC. 5. All elections which under this act may be held on the first Monday of April shall be considered general elections and shall be held in all cities, wards and townships of the county except the county of Wayne. The manner of preparing and distributing the ballots at any general or special election held under this act, the manner of conducting, canvassing, returning and declaring the result, shall be the same as now prescribed by law for other like county elections, except as herein otherwise provided.

SEC. 6. In any county where the county road system shall be adopted, a board of county road commissioners, not exceeding three in number, shall be elected by the people of such county. The number of county road commissioners shall be fixed by the board of supervisors. In the first instance such commissioners shall be appointed by the board of supervisors or elected at a general or a special election called for that purpose, as shall be ordered by the board of supervisors. If such commissioners are appointed, they shall hold office only until the general election held on the first Monday in April then next following, at which time their successors shall be elected. If such commissioners are to be elected at a general election, notice thereof, embodying a copy of the resolution of the board of supervisors, giving the number and terms of office of the commissioners to be elected, shall be published by the clerk in the newspaper or newspapers selected by the board of supervisors, as required by section three of this act; if a special election is called for the election of such commissioners a like notice shall be given by the clerk, which notice shall be posted and published in such newspapers as required by section three. In the month of March in each

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year thereafter in which a county road commissioner is to be elected, the county clerk shall give notice that a county road commissioner is to be elected at the following election, to be held on the first Monday of April, and shall publish the same in a newspaper or newspapers in manner aforesaid: Provided, That in the counties of Wayne and Mason the election of county road commissioners shall be held at the general election on the first Tuesday after the first Monday in November, and notice thereof shall be given at the time notice is given of the general election.

SEC. 7. Any person elected or appointed county road commissioner shall, within ten days after being notified in writing by the clerk of such county, of his election or appointment, take and subscribe the constitutional oath of office and file the same with said clerk. Each and every county road commissioner shall be required to execute and give official bond in such amount as the board of supervisors of such county may determine, the expense of securing such bond, if any, to be paid from the county road fund. The term of office of the first commissioners elected in any county under this act, shall commence immediately upon filing such oath of office, and shall continue as hereinafter provided. The successor to each such commissioner shall be elected in the year in which a regular session of the legislature is held, on the first Monday in April preceding the expiration of his term. If the number of such commissioners shall be fixed at one, he shall hold office for the term of two years from the first day of May in the year of his election and a successor shall be biennially elected. If the number of such commissioners be so fixed at two, they shall hold office for two and four years respectively from said first day of May, and thereafter one commissioner shall be biennially elected for the full term of four years. If the number of such commissioners shall be so fixed at three, they shall hold office for two, four and six years respectively from the said first day of May, and thereafter one commissioner shall be biennially elected for the full term of six years. No member of the board of supervisors shall be eligible to the office of county road commissioner, and such offices shall not be held by the same person at the same time: Provided, That the board of supervisors of any county where the county road system has been adopted and the number of road commissioners has been fixed by the board of supervisors at a greater number than one, may reduce the number, and in case of a reduction in number as aforesaid no successors shall be elected to those commissioners whose terms shall soonest expire until the number of commissioners shall be reduced to the number specified by the board of supervisors, and thereafter successors shall be elected for the term hereinbefore provided, depending upon the number to which said board shall have been thus reduced and fixed by the board of supervisors.

SEC. 8. In case a vacancy shall occur in the office of county road commissioners, the board of supervisors may appoint a commissioner to fill such vacancy, who shall hold office until the first day of May then next following. At the general election to be held on the first Monday in April preceding such first day of May, a commissioner shall

be elected for the unexpired term of such vacancy. Each commissioner shall hold his office until his successor is elected and qualified. The board of supervisors shall fix the compensation of such commissioners, except in the county of Wayne, where the compensation shall be five dollars per diem, for such time as the commissioners shall serve the county in the capacity as county road commissioners,* and all vacancies shall be filled by appointment for remainder of term by the same official who appointed the commissioner who has vacated the office, and from that same division of the county must the appointment be made.

All following * is void by reason of repeal of portion of Sec. 8.

SEC. 9. A majority of the members of the board of county road commissioners shall constitute a quorum for the transaction of business, but a less number may adjourn from time to time. The board may adopt such rules and regulations for calling and holding meetings and for the transaction of business as they may deem best. They shall annually appoint one of their number chairman to hold during the pleasure of the board. Such board shall be known as the "Board of County Road Commissioners of the county of....." and by that name may, sue and be sued. Process may be served on the chairman or clerk of the board. The clerk of the county shall be clerk of said board of county road commissioners, and shall keep the records and accounts of the board, and preserve its files in the manner directed by the board.

SEC. 10. Neither the clerk nor any member of the board of county road commissioners shall, directly or indirectly, either personally or as a member of any firm or stockholder in any corporation, be pecuniarily interested as contractor or employe in any contract entered into or work carried on by or for such board, or in property purchased or sold by or for such board: Provided, however, That this section shall not be construed to prevent the purchase of land for a road, from a member of the board or the clerk thereof. Said board of commissioners may employ such superintendents, engineers, servants and laborers, and purchase such machines, tools, appliances and materials as shall in their judgment be necessary or convenient for the proper carrying on of their work.

SEC. 11. Said board of county road commissioners may lay out such new roads within the county as they deem necessary. Such roads shall be not less than two rods wide. Said board may also change the width or the location or straighten the line of any road over which they take jurisdiction. If in the laying out, widening, changing or straightening of any road it shall become necessary to take private property the said board shall cause a survey of such proposed road to be made together with an accurate description of the lands required therefor. Thereupon they shall endeavor to agree with each owner, resident of said county, for the purchase of a right of way over his land included within such description. If they are able to agree with the owner thereof, they may purchase the same and pay therefor out of the funds under their control, and such lands shall then be conveyed to the county for the use and purpose of a road.

SEC. 12. Whenever said board shall be unable to agree with any person interested in any parcel of such land, or such person shall be unknown or a non-resident of the county, or a minor, or an insane or incompetent person, the board may present to the circuit court or probate court of the county a petition, describing the proposed road and each parcel of land necessary therefor which they have been unable to acquire, giving the name of each person interested in each parcel so far as known, and praying for the appointment of three commissioners to determine the necessity of such proposed road, the necessity of taking each such parcel therefor, and to appraise the damages to be paid as compensation for such taking of each parcel for road purposes. The court shall appoint a guardian ad litem for any minor, insane or incompetent person interested in the proceedings. The guardian shall be a resident of the county. Upon the filing of the petition, the court shall make an order fixing a day for the hearing on such petition, which shall be not less than three weeks thereafter. Such order shall recite the names of the persons mentioned in the petition, the descriptions of each parcel of land and state the purpose of the petition. Such order shall be published once in each week for three successive weeks in some newspaper published and circulated in the county as near as any to the land in question, to be designated by the court, and notice thereof shall be served on each person named in the petition interested in the land who resides within the county, and upon each such guardian, at least ten days before the day of hearing. Such service may be made personally or by leaving at the place of residence of the person to be served. Proof of publication and service may be made by affidavit of any person or persons having knowledge of the facts. Such proof shall be filed with the court on the day of hearing, and thereupon the court shall have jurisdiction of the subject matter involved in the proceedings and of the parties interested therein.

SEC. 13. On the day of hearing, the court shall hear the parties and appoint three disinterested persons commissioners, herein called court commissioners, whose duty it shall be to determine the necessity of such proposed road and the necessity for taking each parcel of land described in the petition therefor, and if they shall decide that it is necessary, then to appraise the damages to be paid as compensation for the taking of each such parcel therefor. The court [commissioners] commissioner shall be sworn faithfully to discharge their duty. The court shall fix the time and place for the first meeting of such court commissioners, and require their attendance, it may also authorize the court commissioners to adjourn their meeting from time to time not later than to a day to be named, and shall fix the time for filing the report of such court commissioners.

SEC. 14. The court commissioners shall meet at the time and place ordered by the court. If all do not then appear, a less number may adjourn to a time certain, but no adjournment shall be made to a day later than the time allowed by the court. Such adjournments shall be publicly announced. The court or the clerk thereof may issue writs of subpoena to compel the attendance of witnesses before the court or

before the said court commissioners. Either one of such court commissioners may administer oaths to witnesses. The court commissioners, at the time fixed by the court or at the time fixed by adjournment, shall view the premises described in the petition and hear the proofs and allegations of the parties, and render their decision in the premises. They shall report such decision in writing, signed by them or a majority of them, at the time fixed for that purpose. If their decision is that the road is necessary or that any part of the land described in the petition is unnecessary to be taken therefor, no further proceedings for the establishment of such road shall be taken for one year thereafter; if the decision is that the proposed road is necessary and that such lands are necessary to be taken therefor, they shall appraise the damages to be paid as compensation to each person interested for each parcel of land.

SEC. 15. The court may, at the time of the filing of the report or at such other time to which it may adjourn the proceedings, on cause shown, set aside the report and refer it back to such court commissioners or appoint other commissioners to retry the questions involved, whereupon such proceedings shall be had as are hereinbefore provided for. The court may permit the amendment of any petition, affidavit, order, report or proceeding filed or had in the premises in such manner as shall be just and proper; it may fill any vacancy that shall occur among the court commissioners; it may permit a defective proceeding to be set aside and other proceedings in compliance with law to be had in place thereof; it may adjourn such proceedings or any part thereof from time to time, and may make all such orders in the premises as may be just and proper to further and accomplish the purpose thereof.

SEC. 16. After the court shall confirm the report of the court commissioners, it shall enter an order authorizing the board of county road commissioners to pay the several sums awarded for damages, and the board shall pay the same accordingly. Such payment shall be made in money to the several persons entitled thereto, and if refused, or if there be no person properly authorized to receive the same, it shall be deposited as directed by the court. Upon filing proof of payment or deposit as ordered, the court shall prepare a certificate under its seal, signed by the judge, reciting briefly the proceedings that have been had, giving the names of the parties interested, describing the lands taken for such road, the award of damages therefor and the payment or deposit of the money, and deliver the same to the board of county road commissioners, and thereupon the title to such land shall be deemed vested in the county to be used for road purposes only. Such certificate shall be recorded in the book of deeds in the office of the register of deeds. Such [certificate] certificates or the record thereof or a certified copy of such record shall be prima facie evidence of the facts recited therein, and of title to such lands in the county and of the right of the board of county road commissioners to construct and maintain a road thereon. The court shall fix the compensation of the court commissioners, not to exceed three dollars per day, and determine the amount of necessary expenses incurred in connection with such pro-

ceedings which shall be paid by the board of county road commissioners.

SEC. 17. The boards of county road commissioners of adjoining counties may unite in laying out and establishing a county road on or near the line between their counties, and may institute proceedings to acquire the lands for such road, and may thereafter construct and maintain such road at the joint expense of the counties.

SEC. 18. Any road heretofore laid out, or any part thereof, shall become a county road if the board of county road commissioners shall at any time so determine and in passing through, or on the line between townships and incorporated villages, any streets or parts of streets of such village may be adopted as a county road, with consent of the proper authorities of such village or villages. The vote of the county road commissioners in respect to such determination shall be taken by yeas and nays, and shall be entered at large on the records of said board of county road commissioners. Notice of such determination shall be forthwith given by the clerk to the highway commissioner of each township and the highway authorities of each village in which said road or any part thereof is situated, and published in some newspaper printed and circulated in the county, once in each week for three successive weeks. Proof of such service and publication may be made by affidavit by any person knowing the facts, and be filed with the clerk. Such affidavit or the record thereof, or a certified copy of such affidavit or record, shall be prima facie evidence of its contents. After service and publication of such notice, the board of county road commissioners shall have sole and exclusive jurisdiction and control of such road so embraced within such determination, and the township or municipality within which the same is situated shall be relieved from all responsibility therefor. Immediately after laying out or taking control of a road, said board shall give the same a name by which it shall afterwards be known in their proceedings. The board of county road commissioners of any county which has adopted the county road system, are hereby authorized and empowered to, at any time, abandon and discontinue any county road or any part thereof, by a majority vote. The vote of the county road commissioners in respect to such abandonment and discontinuance, shall be taken and entered, and notice thereof be given, in the same manner as is required in this section, in cases in which county roads are adopted. After proceedings to discontinue and abandon have been had, the jurisdiction and control of such road shall revert to the township or municipality within which the same is situated, which prior to the time of its adoption as a county road, had jurisdiction and control thereof, and the county shall be relieved from the responsibility therefor.

SEC. 19. Said board of county road commissioners shall have authority to grade, drain, construct, gravel or macadamize any road under their control, or to place thereon any other form of improvement which in their judgment may be best, and may extend and enlarge such improvements; they shall have authority to construct bridges and culverts on the line of such road, and to repair and maintain the said roads, bridges and culverts; they shall have all the authority in respect to

such roads which is vested in highway officers in townships, relative to encroachments and obstructions thereon. Said board of county road commissioners may maintain in their own name an action for any injury to any county road or to any part of the whole width thereof as laid out and established, or to any of the improvements thereon. All moneys recovered in any such action shall be paid to the county treasurer, and be credited to the county road fund. All contracts for the construction of roads exceeding one hundred dollars in amount shall be let by sealed proposals and be awarded to the lowest responsible bidder. The board of commissioners may reject any and all bids.

SEC. 20. On or before the first day of October of each year, said board of county road commissioners shall determine upon the amount of tax which in their judgment should be raised for such year in said county for the purposes aforesaid, specifying and itemizing the roads and parts of roads upon which such moneys are to be expended, stating the amount asked for each of such roads, and shall cause such determination to be entered upon their records. Such tax shall not exceed two dollars on each one thousand dollars of assessed valuation of such county according to the assessment roll of the last preceding year, except in counties where the privilege of a greater tax has been granted by the legislature, and in the counties of Wayne, Kent and Houghton it shall not exceed twenty-five cents on each one thousand dollars of the assessed valuation of the county according to the assessment rolls of the last preceding year. At the annual meeting of the board of supervisors held in October, the county clerk shall lay such determination before the board of supervisors and such board of supervisors shall pass upon the said determination, and if a majority of such board of supervisors shall agree therewith, then such tax shall be apportioned between the several townships and cities of said county according to their equalized valuation. If the determination of the board of county road commissioners shall not meet with the approval of a majority of the board of supervisors then the said board of supervisors shall proceed to decide upon the amount of tax to be raised for such year in such county for the purposes aforesaid, and may allow or reject in whole or in part any or all of the items for the sections of roads thus submitted for its consideration; and it shall not be lawful for such county road commissioners without the consent of such board of supervisors to expend any such moneys upon any other roads than as thus specified; which tax shall not exceed two dollars upon each one thousand dollars of the assessed valuation of the county according to the assessment rolls for the last preceding year, except in counties where the privilege of a greater tax has been granted by the legislature, and which tax shall not be less than one dollar upon each one thousand dollars of such valuation, except by a two-thirds vote of all the members elect of said board of supervisors. In the counties of Wayne, Kent and Houghton the tax shall not exceed twenty-five cents on each one thousand dollars of assessed valuation, according to the assessment rolls for the last preceding year. After the said board of supervisors shall have decided upon the amount of tax to be

raised, the said board shall thereupon apportion such tax between the several townships and cities of said county according to their equalized valuation. The supervisors or other assessing officers in such townships and cities shall levy and apportion the taxes so apportioned as provided in this section, to their respective townships and cities, upon the tax rolls of such townships and cities respectively, upon which the county taxes are assessed. The taxes so assessed shall be collected and paid to the county treasurer, the same as other county taxes. All the provisions of law relating to the assessment, levy, collection and return of county taxes and the sale of property delinquent therefor, shall apply to taxes to be raised pursuant to this act. The county treasurer shall keep a separate account of the taxes collected and moneys received under this act, and shall pay the same out only upon the order of such board of county road commissioners and upon warrants signed by the chairman and countersigned by the clerk of the board. In counties having a county auditor, or board of county auditors, the warrants shall pass through the hands of such county auditors and be further countersigned by them, when payment shall be made thereof by the county treasurer. All moneys raised under the provisions of this act shall be expended by such board of county road commissioners exclusively for the purposes herein mentioned.

Sec. 21. Said board of county road commissioners shall have no power to contract indebtedness for any amount in excess of the moneys credited to such board and actually in the hands of the county treasurer: Provided, That the board may incur liability upon contracts, after a tax is voted, to an amount not exceeding three-fourths the said tax. It is hereby made the duty of the counties to keep in reasonable repair, so that they shall be reasonably safe and convenient for public travel, all county roads, bridges and culverts that are within their jurisdiction and under their care and control and which are open to public travel. The provisions of law respecting the liability of townships, cities, villages and corporations for damages for injuries resulting from a failure in the performance of the same duty respecting roads, under their control, shall apply to counties adopting such county road system. In actions arising thereunder, service shall be made upon the chairman of the board of supervisors or the county clerk of the county made defendant therein, which shall be named in the process as the "county of, " and any judgment obtained thereon against such county shall be audited and paid as are other claims against such county.

Sec. 22. Whenever the board of supervisors of the county by a majority vote of all the members elect resolve to contract indebtedness or issue bonds to raise money for the construction and maintenance of county roads, the question shall be submitted to a vote of the electors of the county at a general or a special election called for that purpose. Notice of the submission of such resolution to a vote of the electors and in case a special election is called, notice of the calling of such special election shall be given in the same manner and for the same length of time as now prescribed by law. If a majority of the

electors voting on such resolution shall vote in favor thereof, it shall be deemed to have carried. The manner of stating the question upon the ballots shall be prescribed by the resolution of the board of supervisors. No bond or evidence of indebtedness shall be negotiated at less than par and the accrued interest. All money raised by the board of supervisors for the construction and maintenance of county roads shall be expended under the direction of the board of county road commissioners.

SEC. 23. All roads in townships except county roads shall be township roads, and all the provisions of an act entitled "An act to revise and consolidated the laws relating to the establishment, opening, improvement and maintenance of highways and private roads, and the building, repairing and preservation of bridges within the state," approved June eighth, eighteen hundred eighty-one, and the acts amendatory thereof and supplementary thereto, and all other provisions of law relating to highways, roads and bridges, and to the powers, duties and liabilities of highway commissioners, overseers of highways and township boards now in force, except as they are modified by the foregoing provisions of this act, are hereby continued in force in counties where the county road system shall be adopted, and except as so modified, shall operate in the same manner as before the passage of this act.

The act of 1881 above referred to is repealed by the provisions of Act No. 108, P. A. 1907, which however in no wise affects the provisions of the county road law.

SEC. 24. In counties where the county road system is not adopted in manner aforesaid, this act shall not be operative, but in all such counties the acts and provisions of law mentioned and referred to in the last preceding section shall be operative, and shall have the same force and effect as though this act had not been passed.

SEC. 25. Accurate accounts shall be kept under the direction of the board of all money received and disbursed by it, and a full statement thereof, together with a complete statement in detail, of all work done, right of way acquired, and road constructed by said board shall be made to the board of supervisors of the county at its annual meeting each year. The accounts of said board of county road commissioners shall be reported to and audited by the board of supervisors at each meeting thereof: Provided, That in counties having a board of auditors the accounts shall be audited by the board of auditors of that county, but the said board of auditors shall have no jurisdiction over the expenditure of any portion of the county road fund, further than the mere auditing of accounts.

SEC. 26. Any organized township in any county under the county road system in which a county road has not been built within a year, and which shall raise sufficient funds to build a mile or more of state reward road in a year, and shall build the road and receive the state reward thereon, said township shall be entitled to receive the same amount of money from the county road fund as was received in state reward: Provided, That if such township shall not have paid into the county road fund for the year in which such road was built, an amount equal to the amount of state reward received by such township, then the township shall be entitled to receive only as much money from

the county road fund as the said township paid therein for that year: Provided, further, If any organized township in any county under the county road system shall raise money by tax or by sale of bonds to build more than two miles of road such as merits state reward in a year, and the road is built and approved by the state highway commissioner, and this road is kept in as good condition as when approved by the commissioner, such township shall draw each year from the county roads fund the same amount as was paid to said township in state reward for that year: Provided, That the amount of money road tax paid into the county road fund by such township for that year, shall be equal to the amount of such state reward, and if such township shall not have paid in an amount equal to the amount of state reward, then the township shall be entitled to receive only as much money from the county road fund as the said township paid therein for that year.

SEC. 27. In case any organized township shall decide to build a mile or more of state reward road as provided in section twenty-six of this act, the township board of such township shall file a written notice with the board of county road commissioners through the county clerk, on or before the first day of May in the year in which such road is to be built, stating that it is the intention of such township to build a certain piece or pieces of road, which shall be fully described in such notice, and thereupon the board of county road commissioners shall furnish an engineer or surveyor who shall establish a grade for such road or roads, and set grade stakes on each side of the road, not more than one hundred feet apart, to which the grade shall conform. Should a road which the township has decided to improve be a portion of one that the county road board is improving or proposes and intends to improve, then such township shall build such piece of road of such material and of such width as will conform to the proposed plans of such county road board for such road. When the township shall have built a road as above set forth, and the state reward has been received thereon, the township clerk shall notify the board of county road commissioners through the county clerk, and thereupon the said board of county road commissioners shall draw a warrant upon the county treasurer for the amount of money due said township and shall forward such amount of money to the treasurer of such township: Provided, That the road shall be completed prior to the fifteenth day of November in the year for which such application was made, in a manner which will merit state reward.

SEC. 28. The board of supervisors of any county which has adopted or may hereafter adopt the county road system, may upon petition of ten freeholders residing in each of the several townships, incorporated villages and cities in the county, submit the question of rescinding the vote by which it was adopted, and the resolution to submit, and all proceedings subsequent thereto, shall, as nearly as may be, follow the forms and manner of proceedings provided for voting on the question of adopting the county road system.

SEC. 29. When any county shall rescind the vote by which it has



State reward macadam road in St. Joseph township, Berrien county. Built of limestone.



State reward macadam road in St. Joseph township, Berrien county. Built of limestone.

adopted the county road system, this act shall cease to be operative except for the purpose of completing work under contract at the time of such rescission. The funds then remaining in the county treasury or thereafter paid therein to the credit of the county road tax shall be placed in the general fund of said county. When any county shall have adopted the county road system and such adoption shall have been declared null and void by any court of competent jurisdiction, all moneys remaining in the county road fund, or thereafter placed therein, shall, upon resolution, of the board of supervisors, be placed in and become a part of the general fund of such county. All county roads shall revert to the townships, and all highways and bridges shall thereafter be laid out, built and maintained in all respects as though such county had never adopted the county road system.

SEC. 30. None of the provisions of this chapter relative to the election and term of office of county road commissioners shall apply to the county of Marquette, or to any other county in which special provision therefor has been or may hereafter be made by the legislature. In said county of Marquette the board of supervisors shall appoint a board of county road commissioners who shall possess all the powers and duties of county road commissioners under this act. Such board of county road commissioners in said county shall consist of three members, one of whom shall hold his office for the term of one year, one for the term of two years and one for the term of three years from and after the first day of May, nineteen hundred five, and annually thereafter, prior to the first day of May each year, the board of supervisors shall appoint one commissioner for the term of three years to succeed the commissioner whose term of office shall soonest expire. Such commissioners shall hold their offices until their successors are appointed and qualified. Whenever any vacancy shall occur in the office of county road commissioner in said county the board of supervisors may appoint some qualified person to fill such vacancy for the unexpired term of such office. The board of supervisors may diminish the number of county road commissioners in such county as hereinbefore in this act provided.

SEC. 31. Any township which may have adopted the township road plan provided for in sections twenty-six and twenty-seven of act number two hundred thirty of the Public Acts of eighteen hundred ninety-five, as originally set forth, and which has raised money and built roads in good faith, shall continue under such plan until by a majority vote of the electors of such township voting thereon, the township shall abolish such system; and while under such system they shall not, without their consent, be liable to any tax for a county road system, should the county in which such township is situated afterwards adopt the county road system. No township in the state not now in operation under this township system shall adopt it.

SYNOPSIS AND DIGEST.

A petition from each township in a county, signed by ten freeholders in that township, and handed to the board of supervisors, forces that board to submit the county road system to the voters of the county for adoption or rejection. These petitions can be obtained from the State Highway Commissioner.

When adopted, the leading public roads of a county are improved and kept in repair by a board of county road commissioners, at the expense of every property owner in the county.

It not only improves the leading roads but all others in the county, for all the road taxes levied on the property along the county roads, are collected and turned over to the township board and are used by the township highway commissioner in bettering the other roads. County road commissioners have nothing to do with any other roads but the leading thoroughfares which are set aside from the township system of roads. So the townships have fewer roads to keep in repair and more money to keep them in repair with, and of course can improve them every year.

The board of supervisors fix the amount of tax each year, decide upon roads to be cared for and improved, appoint commissioners in first instance, decide upon number to be appointed and fix amount of bonds and compensation, and audit accounts.

The tax for county roads cannot be over two dollars on each one thousand dollars of assessed valuation.

All roads not taken over by the county road commissioners are kept in repair in the usual way by the township.

All damages on county roads are collected from the county.

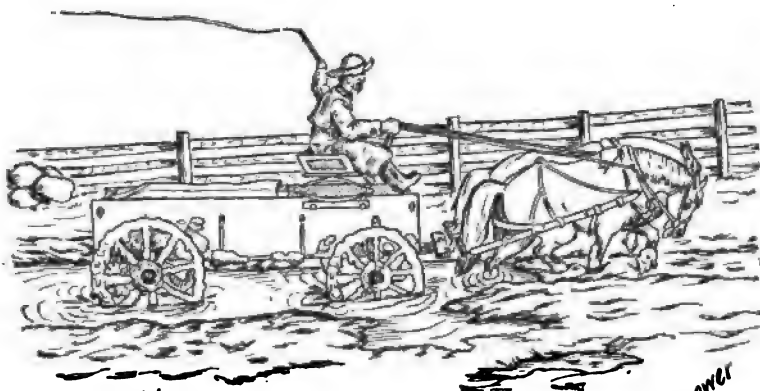
The township road taxes on the property abutting the county roads go to the township to be expended on roads in other parts of the township.

The property along these county roads increase in value, so they who get the greatest benefit, pay the largest tax.

Costly bridges are thus built by the county instead of by the township.

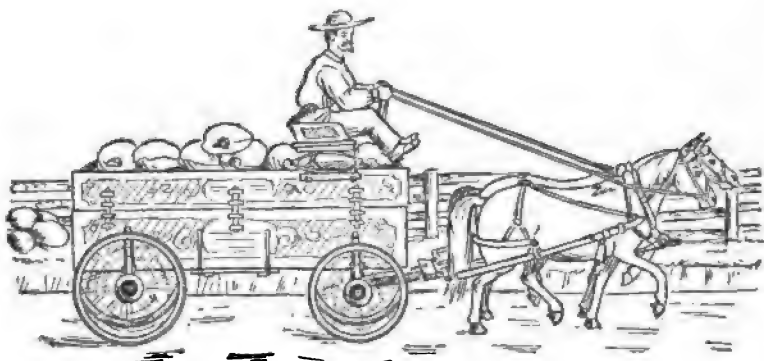
Property in villages and cities contributes the same amount for the county roads as the farm property.

COUNTY ROAD PHILOSOPHY.



*Michigan
State Highway
Department*

Gongwer



*Michigan
State Highway
Department*

Gongwer

The foregoing pictures illustrate the difference between good and bad roads.

To make the pictures perfect, there should be in the first one some children wallowing through the mud on their way to school and in the other as many more happily pursuing their way. These last would be in a mental and physical condition when they arrived at school which would enable them to take up their studies with ease, and so accomplish more than would be possible if they had had to wade through mud ankle deep to get to school.

A good road saves more than half the cost of transportation; but this, when compared with the benefits in making it easy to get to church, school, library, grange, club, lodge, institutes and last but not least, the neighbor's sitting room and dinner table, sinks into insignificance.

Why don't farmers keep farrow cows? Because they eat as much as new milch cows do and give less than half as much milk.

What are new milch cows? Developed farrow cows.

Well—if farrow cows can be developed into new milch cows, why wouldn't it be a wise move to develop new milch cows with udders twice the size of common new milch cows? Because the udder is not the producer of the milk, but simply the receptacle in which the milk produced by the cow is deposited. In order to get more milk the whole cow must be developed.

A county with poor roads in the country and poor streets in the villages and cities reminds me of a farrow cow.

A county with poor roads in the country and fine streets in the cities and villages reminds me of a new milch cow with an abnormal udder.

A county with good roads in the country and good streets in the cities and villages reminds me of a well developed new milch cow.

Under the county road law a farrow-cow county can be developed into a new-milch-cow county.

Good roads like institutions of learning must be good in all departments or they are not good. If a college were good in psychology but poor in languages, good in astronomy but poor in mathematics, it would be worth very little to the average student. A road that is good for four miles, say from the City Hall, Detroit, out Michigan avenue, then poor for two miles, then good for ten miles, then poor for five, is worth very little. As "a chain is no stronger than its weakest link" so the road is no better than its poorest place.

Under the county road system, the leading roads are taken over by the county and are made just as good in every mile as they are in any one, for the reason that there isn't a different pathmaster every few rods operating, or not operating, under a plan of his own.

Well do we remember the story of the lazy, starving man who, when he was offered a load of corn, asked "Is it shelled and ground?"

Had the man really needed the corn to feed small chickens and been unable to shell it and have it ground, probably the would-be donor would not have driven away with the corn, but would have tried to do good by shelling and grinding it.

The corn offered by the state is five hundred dollars a mile for first

class gravel road, and one thousand dollars a mile for first class macadam road. But this corn is not shelled or ground and the state is too busy to do the work even though the township be unable to shell or grind it for itself, and its chickens too small to eat it off the cob. And this is true in hundreds of townships in the state. They are so situated that they cannot build a mile or more of gravel or stone road in a year, and so participate in the state reward.

Then what can be done, so each locality in the state may get its share of corn? To come right down to brass tacks what is the best thing for the county to do? Adopt the county system, And why? Because then its chickens will be large enough to eat the corn furnished by the state, right off the cob. It places the county in a position to get assistance from the state, which in turn develops the county, and so it benefits every citizen of that county.

Good country roads are like fish poles with lines on both ends, making it possible for the farmer in the country to fish in the village and city market any day in the year and so take advantage of high prices. It also gives the village and city merchant a chance to fish in the country for farm products when he is in need of them, for with the telephone he can call up a dozen or more of his farmer friends and in a few hours have on the way loads of potatoes, corn, wheat or any other farm product he may need.

Further, keep this in mind always, that county roads are built by money raised on every dollar's worth of assessed property in Michigan.

A tax is spread on all property in the county, not exceeding two dollars on the thousand dollars of assessed valuation. Then the road building begins, and when it is completed, if built of gravel or stone according to state specifications, a reward is paid by the state of one thousand dollars per mile for stone road, and five hundred dollars for gravel. This money comes from a tax levied on all the property in the state.

So the county becomes a fisherman in the state pond, the township in the county pond, the farmer in the merchant's pond, and the merchant in the farmer's pond, to the benefit of everybody.

There is no person who eats, wears clothes and lives in a house who is not benefited by good roads. Of course the greatest benefit is derived by the farmer, for he can haul more in less time, so he can afford to haul his products farther, and in this way can select his marketing point; but the village and city resident is also benefited, for the more farmers coming to town with their produce, the better for that town and no man is more welcome at the door of the city resident than is the man who tills the soil and brings the product which it has grown.

To be sure there is once in a while a knocker in the city on account of a little tax, and the yell is "Don't we pave our own streets and permit the farmer to use them free?" No! We do not pave them nor allow him to use them free, for it is the city dealer who sets the price on the farmer's load of produce when it is brought to market, and he fixes it at such a figure as will permit him to realize a profit sufficiently large to pay the paving tax in front of his store and residence, and when Mr. Farmer goes with his money to another store to purchase goods, he buys them at the price named, which price includes a paving

tax in front of that store and another home, and often two or three other residences. "But" they say, "we build good streets and give the farmer the right to use them free, and so the farmer should build good roads for himself and allow us to use them free." Well, the farmer has from eighty rods to a half mile of frontage and it would cost often times, half or more, of what the farm is worth, to build a macadam road past it, and there is no sense or justice in expecting twenty or thirty farmers who happen to live along a main traveled road, to macadamize that long stretch of highway for the benefit of thousands of other persons, who will use it.

Roads run in as well as out of a village or city and it is lucky for the village or city that they do, for it is mighty handy to have loads of farm produce coming in as well as loads of merchandise going out. It is getting more valuable each year to the residents of the cities to have good roads, for thousands of local citizens are every day using them for pleasure, in carriages and automobiles, so it becomes more and more equitable for all to help in giving good roads to all.

When the leading roads were toll roads all who used them had to pay for such use. This toll money went to reimburse the builders, to pay for keeping the roads in repair, and to pay dividends to the stockholders. When the toll road charters expired the roads became township roads. Then only those who live in the township have to pay for their use, that is, those roads, after coming into the hands of the township, are kept in repair by the road taxes spread upon the property of the township. So all who live in other townships or in the cities can use the roads without paying a cent.

Notwithstanding this the farmer has been the hardest to convert to believe that the county road system was the best and the only equitable way of building and keeping in repair the leading roads because only then do all in the county pay for using the main roads.

If the railroads should adopt the following plan, it would be just as fair as for the farmer to pay the whole cost of keeping the main roads in repair and then let the city man use them free.

Each purchaser of a ticket would have to tell his business and where he lived before he could get a ticket. The farmer goes to the ticket window and asks for a ticket to Grand Rapids, also asks how much it is, and the ticket seller says, "That depends on what your business is and where you live." "Well," says the man, "I am a farmer and live in the country;" "Well, then, your fare is four cents a mile," and while he is counting his change another man asks for a ticket to Grand Rapids, and he is told by the ticket agent that he must tell his business and where he lives, and he says, "I am a manufacturer of plows and I live in the city," and the ticket seller informs him that he does not have to pay any thing for his ticket. They both stand aghast and ask why this rule has been adopted, and the ticket seller tells them that the state grange and the association of state farmers' clubs passed resolutions requiring the railroads to adopt this new method so the farmers might be consistent in their road doctrines when they oppose the county road system, which provides that all in the county must pay their share, but the farmers claiming they should have the sole right to pay all cost of building and keeping the roads in repair and allow the city men to

use them free. Now under this new rule they also have the privilege, for which they should be very thankful, of paying the whole cost of running the passenger trains and letting the city people ride free.

"This is perfectly right," says the ticket seller, "for don't you know the railroad runs right through your farm and the city does not charge you anything for using their streets, and so you should not charge a city man anything for riding on the wagon roads or railroads across your farm."

I reckon if this plan were adopted that even those who are against the county road system would get their eyes open and say, "Not by a golly derned sight, I aint goin' to pay any more for my ridin' than do those city chaps."

But when they will get it through their heads that fighting the county road system is fighting for four cents a mile for themselves on a railroad and free passage for the city man is more than I know, but I do know that in twenty-six counties we have the county road system, and no more enthusiastic admirers of it can be found than the farmers in those counties working under it. Lots of them voted against it when it was adopted, but they have changed their minds since.

In Germany alcohol is manufactured from potatoes. It is claimed that potatoes there are worth thirty cents a bushel to manufacture alcohol, to be used in generating heat, light and power, when gasoline is worth fifteen cents a gallon and anthracite coal \$6.50 a ton.

"Many farmers there," says our U. S. Consul "use alcohol auto-trucks to haul their produce to market."

Of course in doing this a certain amount of a farmer's potato crop is used to haul the balance to market. In our country the power is hay, corn and oats, and the carrier is a wagon drawn by horses, but it takes a certain amount of the farmer's crop to haul the balance. Too many times this is lost sight of.

Then, the better the road, the greater the load, and quicker the transit; and less of the crop goes to haul the load to market. The less it takes to pay the hauling expenses, or to furnish the motive power, the more there is to sell; the more there is to sell, the better it is for both the seller and the buyer; and the more profit each one of them makes, the more money is permanently invested in both the market center and rural district. As the market centers and rural districts comprise the county and as all property in a county is taxed to build and repair the leading roads under the county road system, each section benefited helps to pay for that benefit.

To be sure horses manufacture fertilizer out of the hay, corn and oats they eat, but cows and sheep can also do this and at the same time pay their board.

No county has ever turned down the county road system that has adopted it. "The proof of the pudding is in the eating," and this is pretty good proof that it is of benefit, or counties would have repealed it before this. In one county for political reasons, the question of doing away with this system was submitted to the people of that county and they voted to retain the plan by a vote of more than four to one. That shows what they thought of it.

Twenty-six counties have adopted this system since the law was passed in 1893, and if all the people of the state could drive over the roads built

in those counties, and compare the common township roads with them, it would convert them, one and all.

The cash tax township system to care for the less important roads, the county road system for the main thoroughfares, in connection with the state reward road plan, gives to Michigan the ideal road system, the best in use in any state in the union at the present time.

GOOD ROADS.

Good roads are worth so much more than they cost, that it costs more not to have them than it does to have them.

There are drawbacks to the good roads movement, some of them are—people who are against everything that is new, against everything that costs a cent, without regard to how much benefit may be derived from the having of it; most of these objections can be gotten out of the way by moral suasion. Lack of knowledge as to how to build can be taken care of by those who do know how if they are employed to instruct. Lack of good material can be supplied, provided the money is furnished. Too small a district often defeats good roads, that is, a township cannot build costly roads and bridges because of the small amount of taxable property, this trouble can only be remedied by the adoption of the county system. Lack of cheap material can be taken care of only by putting our convicts to work quarrying and crushing stone and screening and loading gravel.

Are good roads worth enough to warrant the putting forth of a herculean effort to get? Yes, and how much they are worth can be most easily described by me in giving to you my Pulline and Goine illustration:

Supposing that the average horse is worth \$100, and that some veterinarian should invent a medicine called Pulline, which if you should give a quart of it to a horse, immediately that horse could pull twice as much as he could before, then he would be worth \$200; now supposing another veterinarian should come along with another invention called Goine, and a quart of it would make that horse go twice as fast, and you should dope the horse with it, the horse would now be worth \$400, for he would be able to pull twice as much and move twice as fast. Then you could afford to give \$100 a quart for the Pulline and \$200 a quart for the Goine, and then make money, for it would cost no more to keep these strong and swift horses than it costs to keep the ordinary kind.

I suspect there are all of 500,000 horses in Wisconsin worth now \$50,000,000. Doped with Pulline they would be worth \$100,000,000; doped again with Goine they would be worth \$200,000,000; and in addition there is at least \$100 worth of harness, wagons and sleighs to each horse which are made just as much more valuable as the horses by the doping of the horses, so add to the \$50,000,000 worth of such accoutrements the \$50,000,000 on account of the Pulline and the \$100,000,000 on account of the Goine and you have \$200,000,000 worth of them to add to the value of the horses or \$400,000,000 worth of property where you only had \$100,000,000.

Well—there has no veterinarian invented any such medicine, neither is there any likelihood that there will be any such medicine invented, but there is a way to accomplish the very same result, by simply dopping the roads with good gravel and good crushed stone after the roads have been well drained and graded, and if you do, your horses will be able to draw twice as much and go twice as fast, and if they can they will be worth four times as much, as well as all of the horse accoutrements. The illustration does not over-picture the result one particle and Wisconsin can afford to pay out \$300,000,000 to have it done.

But this isn't necessary, for you can accomplish all you need with a very trifling part of that sum.

How can you get the most good road with the most economical plan?

Under the county system, superintended by a state highway department and aided by the whole state, so that cities and corporations shall help to bear the expense of making the roads good, for they use them and the whole state is made better by them.

In the twenty-six counties of Michigan under the county system, there has been four times as much good road built as in those not under the system. This shows plainly that those counties not under it are in the foreign missionary business, paying state aid tax to build roads in the counties that have wisely adopted the county system. The outcome is—at least thirty of the counties not now under the county system are preparing to vote on its adoption next April. The county system does not take unto the county the entire road system of the county, but the county road commissioners each year adopt portions of the leading roads in different parts of the county and build them over making them good enough with either gravel or crushed stone to merit state aid and keep what they have made good in repair, leaving all of the less important roads to be taken care of by the townships under the cash road tax law. The county system will build a system of roads while the township system alone, with township jealousies, will build fragmentary roads having no interest in the neighboring townships.

(Abstract from an address by Commissioner Earle at the Good Roads Convention at Milwaukee, Sept. 8, 1908.)

BETTER ROADS FOR MICHIGAN.

The road is one of the three parts of the primary transporting machine, the horse and the wagon the other two. Our horses and our wagons are good; in fact, we pride ourselves on our Michigan horses and our Michigan wagons, but we have a right to be ashamed of a great deal of our road. However, the outlook is good, for with the state reward road law, the county road law and the cash tax law, we have the best plan of any state in the union.

The county road system in combination with the state reward road law and the cash tax law makes, in my belief, the most equitable plan for bettering the roads yet devised.

In Wayne county for example they have all three plans in operation. The state reward road tax amounts to about ten cents per \$1000 and the county road tax to twenty-five cents per thousand dollars. Yet these two little taxes will accomplish a great deal, for it is the little on all

property that gives a sufficient fund to do something. That little ten cent tax on all property in the state amounts to \$250,000 for the state reward for two years. The little county road tax on Wayne county gives \$87,000 for county roads in that county, which will secure enough state reward to amount to a total of \$95,000 a year. This will in five years make Wayne county notable for having the best roads of any county in the central west.

Is it right to tax Detroit to build all of the roads of Wayne county? No. Is it right to tax Detroit to build some of the main roads of Wayne county? Yes. Why some, and not all? Because the city people use only the main roads and for that reason it is not only proper to tax them for improving those main roads, and that is what both the county road system and the state reward law do.

After Wayne county adopted the county road system, the county road commissioners were asked how many miles of road they would build in Greenfield township and they said seven and a half; two miles on what is known as Woodward Avenue road and five and a half on Grand River Avenue road. Of the cost of building this seven and one-half miles Detroit will pay eighty-two per cent, but that leaves seventy-three and a half miles of less important road for the farmers in that township to pay the entire cost of keeping in repair.

So as to make sure whether it was right for Detroit to pay toward the cost of building and repairing these two roads or not, I sent a census taker out on Grand River Avenue road in Greenfield township and told him to stop every rig and ask the driver where he was from. The result was that in two hours there were twenty-four users of the road and only one of them was a farmer who lived in Greenfield township. The other twenty-three were either people coming into Detroit from beyond Greenfield township, wearing out Greenfield township's road to no benefit to the township, or else they were from Detroit, going out beyond Greenfield township. Is there any common sense or justice in asking one farmer to build and repair that road for twenty-three foreigners to use free of charge? No. Then, what is the remedy? The county road system that taxes all property in the county a little to build and repair the leading roads, which draws state reward gathered from all property in the state.

Yet the farmers are the worst opponents to the county road system and, in opposing it, you are trying to reserve to yourselves the right to pay the whole bill of improving the roads and let other people who are equally benefited by them use them free.

GOOD ROADS PETITION.

To Honorable Horatio S. Earle, State Highway Commissioner, Lansing, Michigan:

We, the undersigned, owners and manufacturers of automobiles, beg leave to call your attention to the last paragraph of Section 11, of Act No. 196 of the Public Acts of 1905, which reads as follows:

"Provided, That the surplus shall be applied to the furthering of good roads for the benefit of the State at large."



Grand River road, Greenfield township, Wayne county. Tar-veneer macadam road built by county road commission.

We contend that under the above provision the surplus of the motor vehicle fund should be expended in the furthering of good roads throughout the state, and, believing that more can be accomplished under the county road law than in any other way, we, payers of this money, do petition that you expend the same, or a portion of it, in securing the necessary petitions to bring this matter to a vote of the electors in those counties not now under the county road system, and to carry on an educational campaign to secure its adoption.

A. E. F. White.

William H. Murphy.

Henry M. Leland, 69 Watson.

Wilfred C. Leland, 2980 Grand Boulevard W.

Ernest R. Benson, 1634 Woodward.

E. H. Broadwell, 262 Jefferson Ave.

W. J. Lambe, 262 Jefferson Ave.

Cadillac Motor Car Co., Retail Store, 265-269 Jefferson Ave.

Per M. S. Brigham, 265 Jefferson Ave.

Ford Motor Company, per J. Couzens, Secy. & Treas., Detroit, Mich.

James Couzens, 80 Chandler Ave., Detroit.

C. Howard Wills, 39 Bethune Ave. W.

Henry Ford, 66 Edison Ave.

N. A. Cawking, 100 Merrick Ave.

Chalmers Detroit Motor Co., by Hugh Chalmers, Pres., 2700 Jeff. Ave.

R. D. Chapin, 720 Jefferson Ave.

H. E. Coffin, 434 Cadillac Ave.

Lee Counselman, Addison Hotel.

F. O. Bezner, 275 Seyburn Ave.

James J. Brady, 440 Helen Ave.

Packard Motor Car Company,

Per Russell A. Alger, Vice-President, Detroit, Mich.

Henry H. McMillan, Sec'y and Treasurer.

C. A. Ducharme, Detroit, Mich.

John D. Huthening.

F. M. Alger.

Richard P. Joy.

Henry B. Joy, General Manager.

Chas. J. Moore, Manager Mfg.

Russell Huff, Chief Engineer.

S. D. Waldron, Sales Manager.

H. E. Dodge, 240 Monroe Ave.

Jno. F. Dodge, 240 Monroe Ave.

Northern Motor Car Co., Per V. M. Gunderson, Secy. and Treas.

Everitt-Metzger-Flanders Co.

Per William E. Metzger, Sales Manager.

W. E. Flanders, General Manager.

B. F. Everitt, President.

Charles L. Palms, Treasurer.

J. H. Brady Auto Co.

Per J. H. Brady, 234 Jefferson Ave.

Walter J. Bemb, 234 Jefferson Ave.

Maxwell-Briscoe-McLeod Co., per A. I. McLeod, Pres. & Gen. Mgr.
Regal Motor Car Co., per Bert Lambert, Treas.

In compliance with the request contained in the above petition, the signers of which probably represent fifty millions of dollars worth of property in Michigan, men were employed to secure the necessary signatures in those counties not operating under the county road system to force the boards of supervisors to submit the matter to a vote of the people. Petitions have been secured in twenty-nine counties, and the question will be voted on at the April election 1909, when it is hoped that a large majority of those counties will vote to adopt it.

COUNTY ROAD SYSTEM DATA.

*Already under the county road system.

**To vote on its adoption in April, 1909.

No action taken toward voting on this system in those counties left blank.

*Alcona.	*Dickinson.	**Lake.	*Oceana.
*Alger.	**Eaton.	**Lapeer.	**Ogemaw.
Allegan.	*Emmet.	Leelanau.	**Ontonagon.
*Alpena.	**Genesee.	Lenawee.	**Osceola.
**Antrim.	*Gladwin.	**Livingston.	**Oscoda.
Arenac.	Gogebic.	*Luce.	**Otsego.
*Baraga.	**Grand Traverse.	Mackinac.	Ottawa.
**Barry.	Gratiot.	Macomb.	**Presque Isle.
*Bay.	**Hillsdale.	*Manistee.	Roscommon.
*Benzie.	Houghton.	*Marquette.	*Saginaw.
Berrien.	**Huron.	*Mason.	Sanilac.
**Branch.	Ingham.	*Mecosta.	**Schoolcraft.
**Calhoun.	Ionia.	*Menominee.	**Shiawassee.
Cass.	*Iosco.	**Midland.	St. Clair.
**Charlevoix.	*Iron.	*Missaukee.	St. Joseph.
*Cheboygan.	Isabella.	Monroe.	**Tuscola.
*Chippewa.	**Jackson.	Montcalm.	Van Buren.
**Clare.	**Kalamazoo.	**Montmorency.	Washtenaw.
Clinton.	*Kalkaska.	*Muskegon.	*Wayne.
Crawford.	Kent.	Newaygo.	*Wexford.
*Delta.	Keweenaw.	Oakland.	

RESOLUTION ADOPTED BY THE NATIONAL CONVICT LABOR GOOD ROADS ASSOCIATION CONVENTION AT GRAND RAPIDS, MICHIGAN, JULY 23, 1908.

Whereas, There is no department of industrial or mercantile life into which the transportation of raw materials and finished product enters, that is not directly benefited by the construction and maintenance of good roads, therefore,

Resolved, That on the basis of public spirit, economic and expeditious handling of raw materials and finished product, and in the interests of general welfare, it is the duty of every man of business to approve and support the campaign now on in behalf of good roads in Michigan.

And Whereas, The county plan has proved itself to be the most practi-

cal, economical and efficient, we heartily endorse it and recommend it to the electors of every county not now under the plan.

WHAT EDITORS THINK OF THE COUNTY ROAD SYSTEM.

Editor Burgdorf of the "National Farmer," Bay City, writes:

"Is the county road system a good thing for the counties working under it?" We should say that it is, as it benefits, not only the people who constantly use the highways, who are largely the farmers, but it is of general benefit to every resident of every town where these good roads enter. Bay county, for instance, has one hundred miles of stone road. It has been of vast benefit to the upbuilding of the agricultural districts in this vicinity. It has enhanced the price of farm lands and made it possible for tillers of the soil to market their product at one-half what it did cost when the old road system prevailed. It is a step in the advancement of civilization, and after a people in any community has once taken up the system of good roads, they readily see its benefit and speak in highest praise of the same. The National Farmer has been a constant advocate of the system as presented by you. We have noted with interest in our travels about the state some of the good roads in different localities. In Gratiot, Saginaw, Tuscola and Sanilac counties, we have had the pleasure of riding over these improved highways. We have talked with the farmers regarding the benefits, and the universal commendation of the system, leads us to believe that you are doing good work in the state of Michigan. It is easy to see that the people of towns and cities are benefited by good roads, for good roads mean cheaper produce, cheaper wheat and cheaper vegetables. It means, that every city that does not have good roads leading to it, pays highway taxes for the reason that they are obliged to pay an advanced price for everything that comes to town. Let the good work go on and the sooner the whole state is under the county road system the better. State reward should be grabbed at by every community."

City Editor Merrill of the Evening News, Sault Ste. Marie, writes:

"After several years trial of the county road system in Chippewa county, the public has given it unanimous endorsement. Opposition to the system is an unknown quantity, as the results have been of a highly satisfactory nature. The highways are in better condition than ever before in the history of the county.

"Before the system was adopted the roads compared with the average highway where Tom, Dick and Harry have exhibited their talent in constructive ability. The grading was generally done at a time just before the farmer drew his produce to market, thus making the roads almost impassable for heavy loads. There was no system.

"Today we have a good road running south to Pickford, a distance of twenty-four miles from the Soo, constructed of crushed stone. The village has a daily automobile service with the city during all except

the winter months, which would be impossible under the old conditions. Roads run in other directions, tapping the most prosperous farming districts and the system is being rapidly extended from year to year. The time is not far distant when Chippewa county will have one of the finest systems of highways in the world. At every meeting of the board of supervisors petitions asking for the extension of the system are received and as fast as possible they are granted.

"It is an actual fact that the farmers boast that their improved county roads are superior to nine out of ten of the improved streets in the city. They are carefully looked after by the commissioner. Steel bridges are being erected every year and the general conditions, when contrasted with the roads of the counties where the old system is still in existence, are shown to be superior in every detail.

"In counties where the old system holds sway the roads are no better than they were twenty years ago. In Chippewa county they are growing better every year. So far as this county is concerned, the system has been successful in every sense of the word.

Editor Tinkelpaugh of the Kalkaska Leader:

"Kalkaska county was one of the first of the counties in Michigan to adopt the county road system and although hampered in a considerable degree by the lack of suitable material for road building, I think everything considered, that we have made commendable progress, and from what I know of what has been accomplished here, were I to remove to some other county which was considering the advisability of adopting the county road system, I would use whatever influence I might happen to possess to secure the adoption of the system. I believe it to be a movement in the right direction and an infallible indication of a progressive spirit and a determination to keep abreast of the times in the vital matter of good roads. As you doubtless know this is not a thickly settled nor a wealthy county, and we have had to move somewhat slowly. Doubtless, also, some mistakes were made owing to lack of experience in the initial stages of the work; but steady progress has been made, and we now have, roughly speaking, about thirty-five miles of county roads—highways that, everything considered, will compare very favorably with those of any county in Michigan. It might be argued that this is not, in the matter of mileage, a very considerable amount of county road, but we have built according to our means, and the tax has not been burdensome. Moreover, we have accumulated at considerable expense a very complete road building equipment, and our commissioners have gained valuable experience from year to year, while, so far as my observation goes, the people generally are satisfied with the results so far obtained, and are anxious to have the system extended as rapidly as circumstances will permit, and it is my belief that there are very few among the citizens of this county who would be willing to return to the system in vogue prior to the adoption of the present one.

"Personally I am not sufficiently familiar with the details of the work done, so far, as to give anything in the way of statistics and

figures, but would say most emphatically, that if the county road system has proved its worth in Kalkaska county, where there is a great lack of suitable road building material, it should prove even more satisfactory and desirable in sections where an abundance of such material is easily and cheaply obtainable, and it is my conviction that no farmer who has his own best interests at heart should fail to vote for the adoption of the county road system should the opportunity be presented to him."

Editor Harley of the Manistee News writes: "No person has ever been heard to say in public that he regretted the adoption of the system. Under it we have literally transformed this county from a wilderness to a settled, civilized country district, with easy communication where most needed. Hills have been graded down, ravines filled, fills banked with sod and many miles of pike laid.

"The value of the land must have been tremendously enhanced by this work; much of it was before practically inaccessible, and would have so remained to this day but for the county road system.

"The city has gained business, and would be as unwilling as the townships to abandon the plan, although the city pays more than half of the cost."

The editor of Record-Appeal of Ludington says: "If you wished us to write a book about the virtues of county road system it would be easy to do. It is more difficult to compress the many virtues into a paragraph. Briefly, the county road system opens up the main highways, arteries of trade, gives opportunity for making good roads where good roads are needed.

"It leads to more judicious expenditure of money and puts the expenditure into more competent hands. What more can we say? If you want the book, write to us and we shall be pleased to compile it."

Editor Andrews of the Herald-Leader, Menominee, writes: "I can honestly say that since the establishment of the county road system in Menominee county, the farming population has increased two hundred per cent, while the value of farming lands has increased three hundred per cent. While this increase may, to a certain extent, be due to other causes, yet the opening up of the villages is the cause of this great increase in valuation of farm land, as well as the rapid settlement of our county."

W. J. Hunsaker, Publisher Saginaw Courier Herald, writes:

"Replying to your inquiry as to whether the county road system, which has been in operation for several years in Saginaw county, is satisfactory, we have to say that the system is working out very satisfactorily. We hear nothing in the way of opposition to it at all, and very many expressions of satisfaction with its workings. As a matter of fact, since the system was adopted, Saginaw has made more good

roads than during any similar period in its history. It is fast becoming one of the best good roads counties of the state. As editor of the Courier-Herald, the writer has had occasion to come in pretty close touch with this subject of good roads in this and surrounding counties. The Courier-Herald has been a strong advocate of better country roads, especially in the interests of farmers, for a great many years. We know therefore, that the county road system is in every respect a good thing for the county working under it."

REPORTS OF COUNTY ROAD COMMISSIONERS.

ALGER COUNTY.

This county has been working under the county road system since April, 1906, and the first work was done in Burt Township, building $21\frac{1}{3}$ miles of gravel road at a cost of \$3,435.00 per mile, this was a township road leading south from Grand Marais and some heavy grading was necessary to bring all grades down to 6 per cent.

In 1907 work was commenced on the Munising-Chatham Road leading from Munising to Chatham, a distance of 17 miles, this road was all through a heavy timbered country and the work of clearing, grubbing and grading was necessary before any rock work could be done; the object of this road being to open up a new country and reach out into the farming districts of the White Fish River.

The work was all done under contract and the cost was as follows:

Clearing, per mile	\$400 00
Grubbing, per mile	505 00
Grading, per mile	2,500 00
Ditching and offtake drains, per mile	92 00

Total cost per mile \$3,497 00

Roadway being 20 feet wide.

The road crosses the Duluth, South Shore and Atlantic Railway one-half mile east of Munising Junction and an overhead crossing was put in at this point using a fifty-foot steel girder span with two approaches of thirty feet each, making one hundred ten feet total length of bridge, with concrete abutments and floor, at a cost of \$2,285.00; concrete floors are used in all our bridges with 3 inches of gravel on top for a wearing surface.

One-half mile east of Stillman the east branch of the Munising Railway is crossed by an under crossing. This crossing is built of heavy concrete walls with four wing walls. The railway company put in the crossing at a cost to the county of \$2,449.00, the county doing the excavating and refilling. On the seventeen miles of the Munising-Chatham Road there are no grade crossings of railways.

On August 1, 1908, work of macadamizing was commenced on the Munising-Chatham road, beginning at the village limits of Munising and was carried on until winter set in; we were able to build $1\frac{1}{2}$ miles

of macadam road, 14 feet wide, at a cost of \$5,000.00 per mile, the rock used for this work was a limestone rock quarried and crushed at Eben, for which \$1.00 per ton was charged at the quarry for crushing and forty cents per ton freight.

Some work was done on the limestone road which connects the Rock River road with the Marquette road a distance of seven and three-quarters miles. Two miles of this road was built by the township, the other five and three-fourths miles was opened up this year by the county. Most of the work done thus far has been to open up new road as there were no old roads that it was thought advisable to spend any money on at the present time.

Surveys were made last winter from Chatham west to the Marquette county line with a view of opening up nine miles of road to connect with the Marquette county system. It is expected that this work will be taken up next season, also the work of macadamizing and graveling the balance of the Munising-Chatham road.

CHEBOYGAN COUNTY.

We herewith respectfully submit a report of the work done under the county road system in the year 1908:

Commissioner Royal J. Taylor has graded and built on Road No. 6, township of Benton, 4,090 feet of Class C state reward road and 5,573 feet of macadam road, costing \$4,737.69. State reward earned has been \$1,636, making the cost to county \$3,101.69. Road No. 11, known as the Indian Trail, was surveyed for a distance of three miles and contract let for grading and graveling at a rate of \$1,650 per mile. The work was not completed but will be finished next spring.

Commissioner John B. McArthur has had surveyed an extension of Road No. 1 a distance of 7,400 feet, 4,700 is an entirely new bed, 4,000 feet is completed with two coats of gravel, costing \$1,089.34. Balance is being graded, including two large hills. Estimated cost when finished with two coats of gravel, of entire 7,400 feet, including cutting hills to a grade of three per cent—\$3,500. Five miles of this road has already been improved. Road No. 4 has been repaired at a cost of \$300.

Commissioner M. P. Scott has made his report cover the entire period since the adoption of the county road system in 1904 as follows:

Road No. 3, 2¾ miles, grading, claying, graveling, right of way, culverts, etc.	\$3,087 14
Road No. 5, 1 mile, grading, claying, etc.	1,212 74
Road No. 7, ½ mile, claying and graveling	457 75
Road No. 8, ½ mile, claying and graveling	594 45
Road No. 9, 2½ miles, grading hill and graveling.	1,842 31
Road No. 12, 1¾ miles, right of way, grading, ditching, etc.	1,376 41
Road No. 13, 1¾ miles, clearing, stumping, ditching, grading and claying	1,363 97
Total 10¾ miles	\$9,934 77
Amount expended for wagons, scrapers and tools.	883 85
Total.	\$10,818 62

The amount to be raised by tax for carrying on the work under the county road system for the year 1909 as recommended by the county road commissioners is \$13,000.

DELTA COUNTY.

The county road system was adopted by Delta county in 1896. The first board of county road commissioners was composed of five members,—James Doherty, Jules Edoin, Frederick J. Merriam, Peter Groos and John Gunderson. After a careful examination of the topography of the county and due deliberation, the board resolved to adopt certain town and state roads then in use and to lay out and improve others, thereby creating a system of county highways traversing the county in all directions and connecting the principal cities, villages and farming settlements.

This plan called for 166 miles of road and the expenditure of \$175,000.00.

Twice the board of county road commissioners asked the board of supervisors to submit the question of bonding the county for that amount to the electors of the county, and both times the proposition was turned down.

After the second failure to get the funds they deemed necessary to properly carry out their plans, four of the commissioners resigned.

The next year, 1898, the board of county road commissioners was composed of the following five members, Noel Bissonette, John D. Colburn, Jules Edoin, Mr. Jerome and Mr. Knutson. The work of this board was limited to adopting a few stretches of town roads and the laying out and improving of some new roads, all work being done so as to conform with and form a part of the general system as adopted by the former board.

Since 1901 there have been but three members on the board of county road commissioners. In that year it was made up of Louis Jepson, John Gasman and Bazilio Lenzi.

Except that Mr. Jepson has been succeeded by Erick Anderson, the personnel of the board is the same at present.

There has been levied since 1901, from \$16,000 to \$18,000 each year for county road purposes. The amounts collected on this were used in opening up, draining, grading and gravelling roads destined to be important thoroughfares of the county, and in keeping those roads in repair.

In 1906 the board of county road commissioners, influenced more or less by the expectation of receiving a part of the state reward moneys, built one and one-half miles of macadam, receiving the state reward on the same.

They asked the board of supervisors to submit to the electors of the county a proposition for bonding the county for \$25,000 but the supervisors refused to do so.

Nothing was done in 1907 in macadamizing, the county road moneys for that year being spent for repairs, culverts, etc.



Mt. Elliott road, Hamtramck township, Wayne county. Tar-veneer macadam road built by county road commission.

At their October meeting in 1907 the board of supervisors resolved to submit to the electors the question of bonding for \$25,000 and the question was duly carried.

Contracts were let for the macadamizing of 7.78 miles of county road, of which a small portion remains to be finished.

Delta county has under the supervision of the board of county road commissioners 59.77 miles of road, five miles of which are not yet opened up, 45.49 miles are of dirt or of gravel and 9.28 miles of macadam.

The macadam roadways built in 1906 cost as follows,—

1.5 miles 12 feet wide	\$ 6,683 96
.5 miles 15 feet wide	2,889 59

Those built in 1908 cost

7.28 miles 16 feet in width	23,930 55
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Total 9.28 miles	\$33,503 10
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There has been a great change in the opinions of many in this county in the past ten years, regarding the county road system. It is recognized by all now that the county roads are a benefit not only directly in giving good transportation facilities where most needed, but indirectly by its influence on the townships and their road making methods.

This year, 1908, one township constructed about a mile of excellent macadam on which it received its portion of the state reward. Next year this township contemplates building another mile and two or three other townships will undoubtedly make a start that way. There is no question but that the county road system is responsible to a great degree for the better work now being done by the townships throughout the county.

DICKINSON COUNTY.

The road commission in Dickinson county was organized under a special act of the legislature, and the three commissioners are appointed, one each year, by the board of supervisors. The commission appoints an engineer who devotes his whole time to the roads, laying out and mapping with profiles, roads to be taken as county roads, supervising construction and having general charge of the completed roads. The roads so far have been built by contract but an inspector under orders from the engineer is always on the job when macadam is being laid.

The commission has not favored the bonding of the county and attempting to spend a large sum at one time, as much depends on preliminary surveying and careful supervision. For the last three years the annual appropriations with the state rewards have given about \$20,000.00 to spend each year. The board has taken up only such roads as could be improved with the money in hand. After five years the system includes 8.31 miles of macadam road and 3.176 miles of dirt and gravel road. In addition 4.98 miles of new road are under construc-

tion and partly paid for. The average cost of the 8.31 miles of completed macadam road is \$5,422.90. This includes the cost of grading but not of culverts and engineering.

For most of the macadam road so far built, waste rock from the iron ore mines, suitable for the purpose and close at hand, has been available. A silicious dolomite, diorite and field stones have furnished the balance of the road material. Before taking stone from a new source samples are sent to Washington for test and advice. The address is, U. S. Department of Agriculture, Office of Public Roads, Division of Tests, Washington, D. C.

If the road surface is hard the crown should be only sufficient to shed the water. For this $\frac{3}{4}$ inch to the foot is all that is necessary. Too high a crown results in all vehicles using only one track. The single horses then ravel up the center of the crown and the heavy loads wear ruts. To get the co-operation of the public large signs have been put up reading, "Please do not drive single horses in the middle of the road. It wears out the crown," and "Please do not make a rut. Vary your wheel tracks." How much influence the signs have had can not be known, but the results from them and from the proper construction of the road are that the wear is well distributed and the roads show no track or rut after four years' use.

During the drought last summer the macadam roads were being raveled up by horses' feet. In order to protect them a coating of sand about half an inch thick was spread over the roadway. The roads that were treated in this way, run through sandy lands so that in most places all that was necessary was to spread the sand from the sides of the road. This was done by the section crew, which consists of a man and a boy who are engaged during the summer months; and spend their time looking after about six miles of macadam roads. These men repair any holes that appear, look after the ditches, keep the grass and weeds from growing between the ditch and the roadway and keep clean the right of way outside the ditches. The commission believes that this is the best method to keep the roads in perfect condition. The sand used on the roadway in the dry weather protects the surface and prevents the loosening up of the crown of the road. The amount of sand does not interfere with the traction of automobiles and the dust from it is less than the dust from the ground up road material. Where sand without pebbles and not too fine is easily to be had, this road protection in dry weather is very satisfactory.

IOSCO COUNTY.

The county road law was adopted in Iosco county ten years ago. Unfortunately the powers that manipulated the nominating convention when the first incumbents of the offices of commissioners were nominated did not consider the question of fitness, and men were placed in nomination who were not practical road makers and could not be considered as in sympathy with the idea nor informed as to its workings. I do not wish to criticize the commissioners, as they fulfilled

their duties honestly although with a mistaken idea as to what was intended by the "good roads law."

Subsequent changes brought men onto the board who were informed on the subject and enthusiastic believers in the plan. The county is new and but partially developed, consequently the assessed valuation is low and the amount of tax raised for the purpose of building good roads is very small, not reaching \$4,000 per year. This amount when applied to building macadam road is painfully inadequate, and the enthusiasm of the commissioners is not equal to supplying the deficiency.

The first three years the mistake was made of expending the money after the manner of the old path master system which is almost tantamount to throwing the money away. Then prior to the time the state bonus law came into effect an attempt was made to construct well graded roads of sand and clay. Under this plan we were successful in building an excellent road excepting when very wet, and under very heavy traffic. This latter we have to contend with in the hauling of sugar beets, which are largely marketed late in October and November. If sand and clay could be so mixed that it would be of even consistency and in the proportion of twenty-five parts of clay to seventy-five parts of sand, and the atoms so incorporated together as to form a homogeneous mass, applied in two layers of five inches each and thoroughly rolled we would have a road that would withstand very heavy travel even in wet weather. The writer accidentally demonstrated that an excessive amount of sand was a valuable ingredient for a clay road. A road had been graded through a sandy district and it was necessary to veneer the bed with some material that would form a hard surface. Not having either gravel or stone available it was decided to build a sand-clay road and the builder was directed to spread four inches of buck shot clay evenly, and before rolling to spread four inches of sand upon the clay, then to mix it with disc harrow and a fine toothed smoothing harrow, then the whole to be thoroughly rolled; the process to be repeated with another four inches of clay and four inches of sand. After about twenty rods had been completed the writer had a change of heart, the surface of the road appearing so very sandy, and orders were given to reduce the amount of sand materially. Results have proven, however, that where the greater amount of sand was used the road is far superior in every respect, and were we building sand-clay roads again we would use more sand rather than less.

Since the state bonus has been in vogue we have built two and three-quarters miles of first-class stone road, earning a bonus of \$1,000 per mile. We have been successful in building this stone road on deep sand by using a curbing of sod to hold the stone from spreading and using a layer of straw under the stone to prevent the sand from working up through the stone while under construction.

We have also constructed a concrete arch of forty foot span with road-way twenty feet wide above bed of stream.

The work is gaining in popularity in the localities directly benefited, but we have much to contend with because we can not do work in every township at the same time with only money enough to work in one.

MANISTEE COUNTY.

The county of Manistee was one of the first in the state to adopt the county road system. When the matter was first presented to the board of supervisors, it was so little understood and the opposition was so great that they refused to submit it to the people. The next year, owing largely to the influence of the wheelmen's associations, and an address by Col. Muenscher which was published and circulated all over the county, they were induced to reverse their action and the system was adopted at the April election of 1896 by 1028 majority. Fred W. Sorensen and James McAuley were elected the first commissioners in April, 1897. Col. E. W. Muenscher of Manistee was elected as their engineer, and work commenced soon after on the most difficult part of the proposed main line from Manistee to Bear Lake. Mr. McAuley was succeeded by James Henderson in 1901 and Mr. Sorensen by John W. Bradford in 1903 and under their very efficient and intelligent direction the work was gone steadily on, as rapidly as means were provided.

When the system was adopted most of the rural townships voted against it, and it was carried by the votes of the city of Manistee. It was difficult at first to induce the supervisors to vote more than one mill tax, but, now that the benefits of the system are being demonstrated, all opposition has disappeared and no tax is more cheerfully paid than the county road tax.

The plan adopted by the commissioners includes a main line extending across the county from south to north with branches to reach the more thickly settled portions of the county. Most of this main line is now completed, and much work has been done on five branches.

The topography of the county is very unfavorable to cheap construction of roads. The Manistee River and its tributaries have cut wide and deep valleys, and the northern and most thickly settled half of the county is traversed by several ridges which rise over four hundred feet above Lake Michigan and make it extremely difficult to obtain moderate gradients except at heavy expenditure for grading. One section of the Onekama Branch rises 354 feet in 7250 feet. It was decided at the outset to adopt a maximum gradient of five per cent with the traffic and three per cent against it, and this has been adhered to on the main line, but on some of the branches it has been necessary to use six per cent and even seven per cent for short distances. These gradients necessarily require heavy grading and one cut contains 20,000 cubic yards and the adjacent fill 30,000. Another difficulty with which the county has had to contend has been the scarcity of good surfacing material. There being no rock in the county, the roads, with the exception of about three-fourths mile of stone imported from Wisconsin, have been surfaced with gravel, much of which contains too much sand to be of the best quality. It is the intention of the board to purchase a screening plant and use screened gravel in the future. The county owns its steam road roller and grader, and the character of the work generally will compare favorably with that of gravel roads anywhere in Michigan. The cuts and embankments are made abundantly wide, drainage is carefully provided for, and, with the exception of a few large steel pipes

only concrete culverts are now being constructed. The slopes of all deep sand cuts and fills are sodded and fenced. The total cost of the system to November 16th, 1908, has been \$158,832.88. Thirty-three miles of road have been completed, seven and one-third miles are now under construction and five and two-fifths miles have just been laid out for next year's work. Usually old established roads have been followed but in several instances it has been found necessary to adopt entirely new routes. The people of Manistee county can heartily recommend the county road system to all other counties.

MARQUETTE COUNTY.

The county road system was adopted in this county during the summer of 1905, and in September of that year the county road commission was organized with Mr. W. H. Johnston, chairman, and Mr. J. E. Sherman and Mr. M. M. Duncan the other members. These gentlemen have been re-appointed to succeed themselves. Mr. V. S. Hillyer was appointed engineer and superintendent.

The first improvement was the Negaunee-Marquette road, because it connects the three important cities of the county. Seven miles of this road have been graded and macadamized and the rock crushed and put in stock pile for completing the remaining half mile. Good trap rock was used throughout this work, the metaled track being fourteen feet wide and the roadway twenty feet between side ditches.

Two miles of earth road between Humbolt and Republic have been nearly finished, while surveys, including levels and cross-sections, for thirty-two additional miles of main highway have been made.

Equipment has been purchased consisting of two steam road rollers, one small portable, and one large portable crushing plant, one portable boiler and engine, one large power drill, one hammer drill, one air compressor, sprinkling wagon, rock spreading wagons, road grader, wheel scrapers, drag scrapers, two camp outfits for about sixty men each, two blacksmithing outfits, surveying instruments and camp outfit, and numerous other small tools and supplies necessary for carrying on the work. This equipment has been acquired by degrees, the large crusher being received in time to do but one month's work this season.

The location of our roads is approached in a manner somewhat similar to the location of a railroad and practically a railroad survey is made for this purpose keeping in mind an allowable maximum grade of six per cent, and sacrificing alignment to cost of grading. For this work a surveying crew of six or seven men, with a cook, is put into the field. The board first indicates the general location of the road, and the final location selected by the engineer, after considering the costs of construction and right of way, has to be approved by the board.

It will require ninety miles of main highway in this county, outside the incorporated cities, to connect with the roads of adjoining counties on the east, south, and west. Fifty miles of this will be through a rough and rugged country consisting of high rocky hills alternating with

swamps and lakes and innumerable creeks, forty miles through a good but little developed farming country. This county is in the center of the famous hunting and fishing region of northern Michigan, where nearly every other hunter you meet uses up all his deer license tags every season, and where, from the 1st of May to the 15th of August, a fine mess of trout may be caught by expending just enough energy to make the sport fascinating. The scenery of the region has not the grandeur of the Rocky Mountains, but there is a weird wildness about it that is alluring.

Our working season is from May 1st to November 1st, and it is seldom anything can be accomplished before or after these dates. The country being so sparsely settled it is necessary to establish and maintain camps with all needful supplies to hold men and teams on the work. Wages for men and teams have ruled from ten per cent to twenty-five per cent higher than in many counties because the active mines in this county have absorbed practically all the local labor supply. As none of the work has been done on contract the entire supervision has fallen on the engineer. Average costs for doing work so far have been as follows:

Quarrying and crushing, with small crusher, per cubic yard.	
Includes all supplies, repairs, and moving and setting up crusher outfit several times	\$1 00
Grading, per mile. Includes clearing and grubbing, rock cuts and ditching	1,950 00
Macadamizing, per mile. Includes 2,040 cubic yards rock, average haul one mile, spreading, rolling, sprinkling and trimming shoulders	3,800 00
Camp building and maintenance, per mile	1,020 00
Surveying, per mile of survey	150 00
Executive expenses since organization of board, per mile of road built	370 00
Total cost of bridges and culverts.....	3,100 00

MASON COUNTY.

A few lines about roads and bridges in Mason county built under the county system. We have built roads under this plan about sixteen years. We have adopted one hundred eighty miles of road and have built permanent roads to the amount of forty miles. We have sixteen steel bridges and several concrete arches ranging from four foot to fifteen foot span and several concrete floors on bridges. We are using concrete entirely for culverts.

We started in on the two mill tax but found it wouldn't build our roads fast enough to satisfy the people, so we have a special act that gives us the right to raise three mills. We have built under the state specifications for three years, this year we built eight miles of road under the state plans, two miles lay inside the village limits, and we have received state reward on the six miles.

When we started to build roads sixteen years ago we built the roads for wagons and oxen but now we have to build for horses and wagons

and carriages without horses. These last cause the hardest wear we have to contend with, it seems we must build roads more permanently even than we are now doing, for the auto is here and here to stay, and I for one don't think we care to dispense with them, so let us build more roads and build them wide enough to distribute the travel and I don't believe we will then have any desire to crowd the auto off the road. I have heard it stated that it would be a good idea to put an exorbitant tax on them, for a man that can afford to own an auto can afford to pay his tax, but do we consider the man that can afford these luxuries is generally a pretty good man for the tax collector to call on anyway. We all join in thanking Horatio S. Earle for the interest he has taken and the good work he has done for our roads in Mason county.

MENOMINEE COUNTY.

In writing a brief sketch of our county road work it would probably be well to get a casual glance of the shape of the county road system.

Our county is roughly wedge shaped with the long axis lying north and south and the main or No. 1 road extends from the city of Menominee north along this axis forty-two miles to the village of Spalding and from there runs east eight miles to the Delta county line. It also runs west from Spalding ten miles to the Dickinson county line.

The eastern face of the wedge is formed by the shore of Green Bay and along this line extends our Road No. 7 while the western face of the wedge is bounded by the Menominee River and this in general gives direction to our Road No. 5.

From Road No. 1, above mentioned, there are two other roads between Menominee and Spalding, running east to the Bay shore and west to the Menominee river.

In all we have one hundred twenty miles of road in our county road system, of which seven miles of macadam and four and one-half miles of gravel were built under state specifications.

During the year ending October 12th, 1908, we completed three miles of macadam and three miles of gravel road for which we received state reward; and surveys and profiles are now being made for our next year's work which includes eight miles of macadam, stone gravel and gravel roads to be built under state specifications.

The expenditures in our county road system for the year ending October 12th, 1908, were as follows:

3 miles macadam road	\$7,390 91
3 miles gravel road	3,669 50
General repairs and improvements on old roads	6,403 41
Work on new roads and extensions	2,429 35
New machinery	2,300 00
Salaries of superintendents	1,633 89
Total	\$23,827 06

WAYNE COUNTY.

The Wayne county road commission have made a modest start toward improving the main highways in Wayne county during the past year, and we believe as the work progresses that the public will heartily endorse their own judgment of the benefit of the system as was evidenced by their vote in adopting the plan by approximately 40,000 "yes" votes to 7,000 "no" votes.

The following is a brief resume of the work done in 1908:

8,500 feet of tar veneer macadam road built on Grand River road; 5,650 feet of tar veneer macadam road built on Mt. Elliott road; 3,550 feet on Gratiot road; 1,300 feet on Mack road. In addition to the tar veneer macadam constructed on Mack road, through agreement with the township board, an old macadam road was resurfaced for a distance of 3 miles. 4,800 feet of tar veneer macadam road was built on River road; 4,300 feet of tar veneer macadam was built on Fort road; 5,300 feet of brick pavement, width of road thirty-eight feet, was built on Michigan avenue. This work was partly in connection with the township. 1,200 feet was resurfaced on Jefferson avenue. One steel and concrete bridge was built over Monguagon Creek, 31 feet long, 18 feet wide, with concrete deck; and one steel and concrete bridge over the county drain on Fort road, 24 feet long, 18 feet wide, with concrete deck. The bridge over Connor's Creek on Gratiot road was replanked and put in serviceable condition. 1,300 feet of ditching, tiling and drainage was constructed on Mt. Elliott beyond the tar veneer macadam, including one reinforced concrete culvert. One mile of tile was laid on Gratiot road, and also one mile of tiling constructed on Grand River road beyond the work completed this year.

In making our start this year we were compelled to do an immense amount of detail, the nature of which you may be able to comprehend from the following: Two railroad sidings, capable of accommodating eleven cars each, were constructed; also two water standpipes, two small sheds for materials, and roads built leading to sidings and at storage yards.

This work will place the commission in a more advantageous position to do the work of improving our highways in the future.

The main roads connecting with the city of Detroit are called upon to bear an enormous traffic, and in consequence are built wider and deeper than in any other county in the state. The dust nuisance is largely overcome by the application of tar veneer, and in general our specifications are much more exacting than those of the state highway department. The work is constructed entirely with a view of permanency, coupled with a low maintenance cost, in consequence of which our first cost is considerably higher than the average for the state in general. As an illustration of the magnitude of the traffic our main roads are called upon to carry—one firm alone ships 13,000 wagon loads of one commodity every year over one highway.

During the coming year the commission will construct some gravel roads in addition to the macadam work planned.

In this connection, we wish to express our appreciation of the courteous treatment and consideration that has been accorded us by the state highway department, whose suggestions have been of material aid to us.

MUSKEGON COUNTY.

(From Muskegon News, Nov. 10, 1908.)

Muskegon county, the France of Michigan, is in the chief good roads section of the state and is an example for other counties and states for its fine country thoroughfares.

One of the first to adopt the county good roads law, it can be safely said that this county leads the state in this improvement which means so much to the people, and for this reason is becoming one of the most important questions of modern civilization.

At the present time with work for this season at a standstill, there are 80 miles of roads either already constructed or under the course of building. Much of this, however, is in need of constant improvement and repair. Out of this mileage a total of nine miles of macadam road according to the state specifications has been laid, of which six and a quarter miles have appeared during the present season. The eighty miles is the total of so called county roads which has been selected by the board of supervisors from the hundreds of miles of country road throughout the county.

Two years after its passage the board of supervisors adopted the county road law. The state law provides that a county road law may be established by a vote of the electors of the county. This law was passed in 1893. In 1895 the county adopted the system, converting certain country roads, which up to this time had been kept by the townships, into county roads.

The Cedar Springs and the Whitehall roads were the first to be built by the board. The present law allows the supervisors to vote a two mill tax on all the taxable property in the county, which they have correspondingly done. Cities and incorporated villages pay more than half of this tax but none of it can be expended within incorporated limits. For roads built according to these state specifications an award of \$500 per mile for gravel roads and \$1,000 per mile for stone roads, is given by the state. The county received \$6,000 this year for the improvement of the six miles.

The tax which the board of supervisors has raised amounts to \$33,000, to be available next year. The same amount was expended this year.

Muskegon county has paved its roads with either gravel or stone, but now practically considers nothing but stone both because there is no good gravel in this county and because the gravel roads which have been laid are not wholly satisfactory.

The "country" roads which the supervisors have decided to be "country" roads are Cedar Springs, 20 miles; Whitehall, 15; Fruitport, 12; Holton, 14; Ravenna, 9; Lake Harbor, 4½; North Muskegon, 1¼; Peck, ¼; Montague, 1; McKinney avenue, 2, and Sullivan, 2. Total 81.

The Muskegon county road board is composed of Martin Ryerson of Holton, F. D. Hoogstraet of Ravenna and Charles Ellis of Muskegon township. Mr. Hoogstraet has been a member of the board since it was organized, while Mr. Ellis and Mr. Ryerson are serving their first terms, Mr. Ryerson will have been a member of the board four years next May, and Mr. Ellis, five years at that time. John B. Barlow is

clerk of the board. The board when established decided to take over 75 miles to be called county roads and out of this 40 miles has been improved.

They have built some of the finest roads in the country and those built during the season of 1908 are considered so by all road experts who have examined them.

Good gravel is something that cannot be found in this part of the state, as there is too much clay and earthen matter mixed with the gravel. The state highway department will not pay awards on roads built with gravel containing clay in any great amount, as the road goes to pieces in very wet weather and especially in the spring when the frost comes out.

No other county in the state of Michigan has better facilities for drawing the great summer resort trade of the big cities, or of the whole country for that matter, than has Muskegon. In the construction of highways this county is building for this purpose, and is destined to secure a great summer resort business. The banks of the various lakes, Spring, Mona, Muskegon, White, Twin, Wolf, Duck, Black lake and Black creek and Muskegon river will be covered in a few years with resorters, Muskegon county is, in fact, a land of lakes and rivers. There are an innumerable number of smaller brooks and no end of smaller lakes in the interior. Thus the value of fine roads for automobiles and buggy rides is at once appreciated and will be a wonderful feature in the growth.

The cost of these roads is about \$4,000 a mile, and an award from the state of \$1,000 makes the cost to the county \$3,000 for each mile. There has already been expended for improvements the sum of \$275,000.

A good deal more attention is now paid to drainage than was paid years ago. The road is rounded up and must not be less than 18 feet between the ditches, and must also be in accordance with the map and profile given the state department.

The central nine feet is then recessed to a depth of six inches, the bottom of the trench being rolled with a 10-ton steam roller. If the foundation is very soft it is usually covered with marsh hay or straw. Upon this is placed five inches of stone, two and a half inches in size. One inch of one-half inch stone is spread over and rolled into the coarse stone. Upon this is placed three inches of one and one-half inch stone which is dry rolled. With a sprinkling wagon the whole is then saturated with water and thoroughly rolled till it becomes macadamized.

No end of praise is heard for the work of the board of supervisors and the highway commissioners.

Justus S. Stearns, the Manistee salt man, and Dudley Waters, president of the Grand Rapids National bank, rode through the county a short time ago and spoke in very high terms concerning the roads to the south of this city to George R. Abbott of the Hackley National bank. The machine was making the trip from Grand Rapids to Manistee, Mr. Waters returning home from this city. Both men have toured sections of this country and in Europe and without hesitation class the Cedar Springs road as the best upon which they ever traveled.

John Cooper, a prominent member of the teamsters' union, views the



State reward gravel road north of Coldwater in Coldwater township, Branch county. Not "over the hills to the poor house" but over a good road past the county home.

time a few years ago when he drove teams carrying 800 feet of lumber, from a mill on the Cedar Springs road into this city. Several teams had to go in company so that should one get stuck the others could hook on and help out. The mill was out about five miles and it required from 12 to 14 hours to make the round trip, while at the present time he easily carries a full load of hay that distance in half a day.

Both L. P. Walker of the Shaw-Walker company and Mayor John C. Campbell, as well as a number of local automobile enthusiasts are united in the opinion that these roads are unequaled.

The Muskegon county highways, that is, the newly laid stone roads, have shown no effects of the auto traffic, a problem with which the authorities on both this and the other side of the oceans are bothering themselves. The Lake Harbor road during the summer has had an average passage of 50 machines a day. For fruit farming the roads are invaluable, since it offers a rapid and safe means of getting their stock to market in the shortest possible time. It connects the farmers with the city, with each other, and all in all, with the outside world in general. Thus it is readily seen that offering such great inducement in all directions as seen by the roads already thrown open, the change for the better in the county is sure to go on at a rapid rate which will defy a halt for any reason other than the failure of the board to be able to use their two mill tax power, and through them will go on a steady growth in the business and welfare of the county.

COUNTY TAX AND BONDING LAW.

AN ACT to provide for the raising of funds by taxation or the sale of bonds for the improvement of highways in counties or parts of counties, which have adopted the county road system.

(Act No. 168, P. A. 1907.)

The People of the State of Michigan enact:

SEC. 1. All counties or parts of counties which shall have adopted the county road system, may raise by tax for the improvement of the highways in the road district so constituted, not exceeding two dollars on each one thousand dollars of the assessed valuation upon the assessment rolls of the county or district for the preceding year, except in Wayne county, which shall not exceed fifty cents on each one thousand dollars of the assessed valuation.

SEC. 2. All counties or parts of counties in the state, which have adopted the county road system, may issue bonds for the payment of the improvement of such highways as the commissioners of highways decide to make: Provided, Such issue is approved by a vote of the electors of such county or district: Provided further, That such bonds are not issued in excess of three per cent of the valuation of the property assessable for the said highway improvement.

SEC. 3. Such bonds shall not run for longer than twenty years, nor

be sold for less than par, and it is further provided that the funds arising from the sale of such bonds shall be applied solely to the building of improved highways under the control of the road commissioners for the county or road district.

SEC. 4. It is further hereby provided that the board of supervisors in the county may order an election on the question of issuing such bonds in the county or road district on petition of twenty-five freeholders residing in the territory affected, and such election may be held under the provisions of the general election laws.

SEC. 5. It is further provided, that, if a general election be held within six months of the filing of such a petition as is referred to above, the question of issuance of such bonds shall be submitted at such election, but if not, a special election for this question may be called by the board of supervisors.

Given immediate effect.

DIGEST.

Provides that counties under county road law or good roads district may raise a tax of \$2 per thousand dollars of assessed valuation, for county or district work, except in Wayne county which is limited to fifty cents per thousand.

This act undoubtedly repeals the clause in the county road law which prevents Wayne, Houghton and Kent counties raising to exceed twenty-five cents on the thousand dollars of assessed valuation.

Bonds may be issued for 3% of the assessed valuation of counties or districts under the county road law, by a majority vote of the electors voting thereon.

BOND ISSUES BY TOWNSHIPS FOR CONSTRUCTION OF HIGHWAYS AND BRIDGES.

AN ACT authorizing organized townships in the state of Michigan to borrow money and to issue bonds therefor, for the purpose of providing for the better construction and care of highways and bridges in such townships.

(P. A. 193, Act 231, Act No. 47 P. A. 1907.)

The People of the State of Michigan enact:

SEC. 1. The township board of any organized township in the state of Michigan is hereby authorized and empowered, upon an application being first filed with such township board, signed by at least twenty-five freeholders of such township, to borrow a sum of money, not exceeding five per cent of the assessed valuation of such township, on the faith and credit of such township, and to issue the bonds of such township therefor, money so borrowed to be used for the purpose of graveling, macadamizing, building stone roads, building or repairing bridges, or in any other way in the discretion of the township board

providing for the better construction, improvement and care of the highways in such township: Provided, That sixty per cent of the legal voters of such township, voting upon said proposition at a township meeting, a general election or a special election called by the township board for that purpose, shall vote in favor thereof.

SEC. 2. The commissioner of highways shall have charge and supervision, under the direction of the township board, of such graveling, macadamizing, building of stone roads, building or repairing of bridges or any other improvements of the highways of such township, as may be authorized under the provisions of this act, and all moneys paid out therefor shall be paid on the order of the commissioner of highways, countersigned by the township clerk. Said commissioner of highways shall render to the township board at the annual meeting thereof in each year an account in writing, showing the extent of the improvements that have been made on the highways of the township, the roads that have been constructed, or partially constructed, the number and cost of bridges built or repaired, and the amount of money that has been expended for the respective purposes: Provided, That where any township has adopted the township road system, as provided by act number one hundred forty-nine of the public acts of eighteen hundred ninety-three, entitled "An act to provide for a county and township system of roads and to prescribe the powers and duties of the officers having the charge thereof," and acts amendatory thereof, the road commissioners of such township shall have charge and supervision, as provided in said act number one hundred forty-nine of the public acts of eighteen hundred ninety-three, as aforesaid, and amendatory acts; and all moneys paid out for the improvement of highways and bridges shall be paid out on the order of said township road commissioners, countersigned by the township clerk.

SEC. 3. The question of issuing the bonds provided for in section one of this act shall be submitted to the legal voters of such township by the township board within ninety days after the filing of the application mentioned in section one, giving due notice thereof by causing the date, place of voting and object of said election to be stated in written or printed notices to be posted in five public places in such township at least twenty days before the time fixed by said board for such election and by publishing the same in at least one newspaper published in said township, or if none be published in said township, then in some newspaper published in the same county, which is circulated in such township, at least two weeks before the time of such election, which notice shall state the amount of money proposed to be raised by such bonding and the purpose or purposes to which it shall be applied.

SEC. 4. The vote upon such proposition shall be by ballot, either printed or written, or partly printed and partly written, and such ballots shall be in the following form:

"For the issuing of township bonds to improve the highways—Yes.

"For the issuing of township bonds to improve the highways—No."

The election shall be conducted and the votes canvassed in all respects as in other township elections.

SEC. 5. If at such election sixty per cent of such qualified electors present thereat and voting upon said proposition shall vote in favor

of such loan, said bonds shall be issued by the township board in denominations not exceeding one thousand dollars each, at a rate of interest not exceeding five per cent per annum and for a period not exceeding twenty-five years, as the township board shall by resolution direct. Said bonds shall be signed by the township board, countersigned by the township treasurer and negotiated by and under the direction of said board, and the moneys arising therefrom shall be used for the purpose or purposes which have been set forth in the notices of election and the ballots cast at such election, and for no other purpose.

SEC. 6. In case any bonds are issued under the provisions of this act, it shall be the duty of the township board to raise in each year by tax upon the taxable property of such township such sums of money as shall be sufficient to pay the amount of said bonds and the interest thereon as fast as the same shall become due.

SEC. 7. No bonds issued under and by virtue of this act shall be used or negotiated at less than their par value.

DIGEST.

Provides that townships may bonds for 5% of assessed valuation for improving highways or building bridges.

Requires vote of electors, 60% majority will carry.

Highway commissioner is in charge of work authorized by issuing of bonds.

BONDING FOR BUILDING ROADS.

There are some people who simply will not listen when the subject of bonding a county or township for building roads, is mentioned.

If bonding will benefit my children or myself, I should certainly favor doing it; that is, if it is a benefit to either this generation or the next, we should all favor it.

If by bonding the valuation of a county can be doubled then the taxpayers of that county are benefited, because a county with twice the valuation can have twice as many necessities and luxuries as in a county with half the valuation, and that without paying any higher taxes.

Further, the tax on the new property, that is, the land newly developed, the new buildings put up, the new factories, etc., will often pay enough tax that would not otherwise have been paid, during the life of the bonds, to pay them when due. In figuring this we must take into consideration the amount paid by this new property to all the different tax funds in the county.

It is a fact that cannot be denied truthfully, that every county or township in the state of Michigan which has bonded for good roads, has outstripped its neighbors in prosperity. It wasn't the bonding but the roads that did the business. And the reason is easy to find. With good roads, new industries are secured, traveling is easy at all times. The farmer can go to town in half the time with twice as big a load.

The merchant can secure necessary farm products at any and all times as they can be hauled whenever needed. I have never heard of a single county or township which has bonded and built roads, that has regretted it in any particular.

CASH ROAD TAX LAW.

AN ACT to provide for the assessment of money taxes for highway purposes and to repeal chapter two, "Assessments for highway purposes," and chapter three, "The performance of labor on highways and the commutation therefor," of act number two hundred forty-three of the Public Acts of eighteen hundred eighty-one, as amended, being compiler's sections number four thousand seventy-two to four thousand one hundred three, inclusive, of the Compiled Laws of eighteen hundred ninety-seven and all acts and parts of acts inconsistent with the provisions hereof.

(Act No. 108, P. A. 1907.)

The People of the State of Michigan enact:

SECTION 1. The highways in every organized township in this state shall be laid out, improved and maintained by two money taxes; one tax shall be known as the road repair tax, and shall be assessed on all property in the township outside of the limits of incorporated villages, which tax shall not exceed fifty cents on each one hundred dollars valuation according to the assessment roll of the last preceding year, and the other tax shall be known as the highway improvement tax and shall be assessed on all taxable property in the township, including that within the limits of incorporated villages, which tax shall not exceed fifty cents on each one hundred dollars valuation, according to the assessment roll for the last preceding year. All highway moneys belonging to the township or to any subdivision thereof at the time of the passage of this act, shall be added to the road repair fund or to the highway improvement fund as the township board may direct, except such moneys as have been appropriated or set aside for a special purpose, which shall be used for the purposes for which they were appropriated or set aside.

SEC. 2. The commissioner of highways in each township shall render to the township board at the annual meeting thereof in the year nineteen hundred eight, an account in writing, stating:

First, The highway labor assessed and performed in his township within the year;

Second, The amount paid for delinquencies and commutations and other moneys received by him and the application thereof;

Third, The improvements which have been made on roads and bridges in his township during the year preceding such report, and the condition of such roads and bridges;

Fourth, An estimate of the amount of road repair tax which in his judgment, should be assessed upon the taxable property of the town-

ship outside the limits of incorporated villages, for the next ensuing year, not exceeding fifty cents on each one hundred dollars valuation, according to the assessment roll for the last preceding year;

Fifth, The permanent improvements which, in his judgment, should be made on the highways and bridges during the next ensuing year, and the amount of highway improvement tax which should be levied for that purpose, not exceeding fifty cents on each one hundred dollars valuation according to the assessment roll for the last preceding year, which tax shall be assessed on all taxable property in the township, including that within the limits of incorporated villages.

SEC. 3. The commissioner of highways in each township shall render to the township board at the annual meeting thereof in each year after the year nineteen hundred eight, an account in writing, stating:

First, The amount of road repair tax received by him during the preceding year, a summary of the expenditures from that fund, the amount of outstanding liabilities, if any, and the amount of such road repair fund, if any, over and above such expenditures and liabilities;

Second, The amount of highway improvement tax received by him during the preceding year, a summary of the expenditures from that fund, a statement of the permanent improvements made on roads and bridges and of the condition of the roads and bridges so improved, the amount of outstanding liabilities, if any, and the amount of the highway improvement fund, if any, over and above such expenditures and liabilities;

Third, The amount of all other moneys received for highway purposes with a statement of the application thereof;

Fourth, An estimate of the amount of road repair tax which, in his judgment, should be assessed for the ensuing year, not exceeding the amount named in section one of this act;

Fifth, The permanent improvements which, in his judgment, should be made on the roads and bridges during the next ensuing year and the amount of highway improvement tax which should be levied for that purpose, not to exceed the amount named in section one of this act.

SEC. 4. The township board shall cause such statement to be presented at the next annual township meeting, but a failure to render such statement or to present the same to the township meeting shall not affect the right of the electors of the township to vote at such meeting the amount of road repair tax and road improvement tax to be assessed, or of the township board to fix and determine the same as provided elsewhere in this act.

SEC. 5. At the annual township meeting held in each organized township after the year nineteen hundred seven the electors shall, by a majority of those present and voting, who do not reside in any incorporated village, determine the amount of road repair tax to be raised for the ensuing year, not exceeding fifty cents on each one hundred dollars valuation, according to the assessment roll for the last preceding year, and at the said meeting the electors shall also, by a majority of all those present and voting, including residents of incorporated villages in such organized township, determine the amount of highway improvement tax to be raised for the ensuing year, not ex-

ceeding fifty cents on each one hundred dollars valuation, according to the assessment roll for the last preceding year.

SEC. 6. If the electors present at any annual township meeting shall neglect or refuse to vote any road repair tax or highway improvement tax, the township board and the township highway commissioner, acting jointly, shall order to be levied such a sum or sums, for either or both of these funds, as may appear to them necessary and advisable not to exceed the amounts named in section one of this act.

SEC. 7. A certified copy of the record of the proceedings of the township meeting or township board, fixing and determining the amount of such highway taxes, shall be transmitted by the township clerk to the supervisor of his township on or before the first day of October in the year nineteen hundred eight and in each year thereafter, and such taxes shall be levied and collected in the same manner as moneys for general township purposes are levied and collected. The taxes so levied shall be carried out in two separate columns in the tax roll, one as the road repair tax and the other as the highway improvement tax, and the township treasurer shall keep separate accounts of the same. In addition to the bond required to be given by the treasurer by compiler's section number four thousand one hundred sixty-seven of the Compiled Laws of eighteen hundred ninety-seven, such bond shall be in at least double the amount of all moneys to come into his hands by virtue of this act.

SEC. 8. When the amount of either or both of said taxes shall have been determined by the township meeting or the township board, the township board shall have the power and authority to borrow an amount not exceeding three-fourths of the tax determined upon for the ensuing year, for the purpose of paying for labor, material, tools or machinery, or other expenses in connection with the laying out, building, repairing or improving of highways and bridges of the township.

SEC. 9. The road repair tax shall be expended for labor, material and other necessary expenses, under the supervision and by the direction of the township highway commissioner, on the highways and bridges which will directly benefit the property taxed, not exceeding one hundred dollars on any one mile of highway, unless otherwise directed by the township board. Should the highway or highways or bridges directly adjacent to any property taxed, be in good condition so that no repairs are necessary thereon, then the tax raised on such property may be expended by the highway commissioner on other highways or bridges in the township where it may be needed: Provided, If there be a surplus after the highway or highways or bridges directly adjacent to the property taxed have been repaired and put in good condition, such surplus may be expended by the highway commissioner on other highways and bridges in the township wherever any improvement may be needed: Provided, further, That upon complaint in writing to the township board by any ten or more resident taxpayers that the road repair fund is being unequally and unjustly applied, or work improperly performed, the township board may direct the expenditure of such road repair fund or the manner of performing such work: Provided further, That not to exceed twenty-five dollars shall be expended by the

highway commissioner in any one year for tools or machinery, without the consent of the township board.

SEC. 10. The highway improvement fund shall be expended by the township highway commissioner under the direction of the township board in laying out, building and permanently improving or repairing highways and bridges and in the employment of labor, purchasing of material, tools or machinery to be used therefor.

SEC. 11. It shall be the duty of the highway commissioner to see that all highways and bridges are kept in as good condition as possible. He shall employ and direct the employment of such labor as he may deem necessary and advisable, and all disbursements from the highway improvement fund or the road repair fund shall be made upon his warrant, drawn on the township treasurer and countersigned by the township clerk.

SEC. 12. Work to be paid for from the road repair fund shall be completed on or before the first day of September in each year: Provided, That not exceeding one-quarter of the amount of such tax may be kept by the highway commissioner for later necessary repairs, or for plowing, rolling or removing snow in winter.

SEC. 13. There shall be but one road district in each organized township except that in townships consisting of more than one surveyed township, each surveyed township may be a road district, and at each annual township meeting on the first Monday in April after the passage of this act and at each annual township meeting thereafter, there shall be elected in each organized township one overseer of highways for each road district who shall be elected in the same manner as highway commissioners and other township officers are elected and who shall work under the direction of the township highway commissioner. Emergency repairs to an amount not exceeding ten dollars may be made by such overseer of highways without consulting with the highway commissioner, and if the highway commissioner be unable to take charge of the work on highways and bridges because of sickness, absence or any other reason, the overseer of highways shall have charge, and supervision of all work, and in such case warrants drawn by him and countersigned by the township clerk shall be paid by the township treasurer. In case of a vacancy in the office of township highway commissioner through death, resignation or otherwise, the overseer of highways residing in the same road district as the former highway commissioner resided shall act in the place and stead of the highway commissioner, until a new highway commissioner shall be appointed or elected, and shall have all the powers and duties of such township highway commissioner.

SEC. 14. The highway commissioner shall be responsible for the discharge of all duties formerly required of overseers of highways: Provided, Such duties are not in contravention of any provision of this act.

SEC. 15. The township highway commissioner shall be entitled to such compensation as the township board may decide, which compensation shall be not less than two dollars per day nor more than three dollars per day for the time actually employed, and the overseer of highways shall be entitled to such compensation as the township board may decide, which compensation shall be not less than one dollar and

fifty cents per day nor more than two dollars and fifty cents per day for the time actually employed. The compensation of the highway commissioner and the overseer of highways shall be paid from the general or other fund of the township, in the same manner as other township officers are paid.

SEC. 16. All work hereafter done upon roads and bridges except such work as may be required for repairs shall have in view the permanent improvement of such roads and bridges. Before beginning such permanent improvement on any highway, a survey of the highway shall be made by a competent surveyor and a profile of such survey shall be made and placed on file with the township clerk. This profile shall show the grade lines of the center of the highway and the bottom of the ditches, and there shall be indicated upon the profile a grade line showing cuts and fills which in the opinion of the surveyor, should be made in order to establish a good grade. All turnpiking shall be done according to this profile before putting gravel or stone on the highway, unless it can be clearly shown to the township board, and agreed to by that board, that the grade established on such profile will be impracticable and inadvisable when completed, in which case a new grade shall be indicated on the profile, which grade shall be satisfactory to said board. Before proceeding to permanently improve any highway the commissioner shall set grade stakes not more than one hundred feet apart, on the sides of the highway to be improved, to which the grade shall be made to conform. The highway shall be constructed in such a manner as to form a turnpike, sufficiently crowning to shed water, with gutters or ditches adequate for drainage. The width of the turnpike shall be not less than eighteen feet between side ditches.

SEC. 17. After any such turnpike shall be used for one year, the ruts shall be filled, after which it shall be graveled or macadamized in cases where gravel or crushed stone can conveniently be obtained. If it be desired to put on gravel or stone when grading has been completed, the turnpike shall first be thoroughly compacted. In graveling or macadamizing any highway, the gravel or stone shall be placed on the center thereof, in a mass not less than nine feet wide, and not less than six nor more than twelve inches deep, in the discretion of the highway commissioner.

SEC. 18. The work specified in section sixteen and section seventeen of this act shall be continued until all the highways in the township are made equal to the requirements of said sections.

SEC. 19. Whenever any person or persons interested in any highway, wish to improve the same by grading, graveling, macadamizing or paving they may do so at their own expense, and in such manner as may be approved by the highway commissioner; and when sufficient means shall be provided by such party or parties to make the improvement desired, the highway commissioner shall furnish a grade for such highway and direct the manner in which it shall be graded, and his per diem while so employed shall be paid by the township as though the township were making the improvement. The highway commissioner shall, if requested to do so by the party or parties making the improvement, supervise and direct the graveling, macadamizing or paving, and his per diem while so employed shall be paid by the township as

though the township were making the improvement: Provided that no highway commissioner or any other town officer shall be awarded any contract for any labor to be performed under the provisions of this act, and any such contract, so awarded, shall be void.

Sec. 20. Materials for making improvements under any provision of this act, may be taken from any property set aside for highway purposes in the township.

Sec. 21. Chapter two, "Assessments for highway purposes," chapter three, "The performance of labor on highways and the commutation therefor," of act number two hundred forty-three of the Public Acts of eighteen hundred eighty-one, as amended, being compiler's sections numbers four thousand seventy-two to four thousand one hundred three, inclusive, of the Compiled Laws of eighteen hundred ninety-seven, and all acts and parts of acts contravening the provisions of this act are hereby repealed.

DIGEST.

Provides for payment of all road taxes in cash.

Two taxes. Road repair tax to be expended by highway commissioner upon roads which will *directly benefit* the property paying the tax. Highway improvement tax to be expended under direction of township board. Highway improvement tax raised on *all* property in township, road repair tax raised on property outside of incorporated villages. Either tax not to exceed $\frac{1}{2}$ of 1 per cent.

No poll tax.

After tax has been decided upon by township meeting, the township board may borrow $\frac{3}{4}$ of the tax for the purpose of paying for labor, material, etc., at time it is purchased.

New roads can be laid out and opened from either of these funds, from road repair if it directly benefits the property taxed, from highway improvement if township board so directs.

Road repair work must be completed by September 1st, excepting that $\frac{1}{4}$ of tax may be held for later necessary repairs, care of snow, etc.

Highway funds on hand April 1, 1908, become a part of road repair or highway improvement tax as township board decides.

Only one road district.

One overseer, who works under direction of the highway commissioner. May attend to emergency repairs not to exceed \$10 without direction, and acts as highway commissioner if the highway commissioner be unable to perform his work, or in case of vacancy.

Townships containing more than one surveyed township may have one district for each surveyed township, and one overseer in each road district.

Highway commissioner is in charge of all road work, and is responsible for duties of overseers under old law.

Highway commissioner charged with keeping roads in good condition as possible. He employs all the labor, and all payments from either fund are made upon his warrant.

Compensation of highway commissioner not less than \$2 per day, nor more than \$3. Overseers not less than \$1.50 nor more than \$2.50.

Materials for making improvements, such as earth, gravel, etc., may



State reward gravel road in Coldwater township, Branch county

be taken from any property set aside for highway purposes anywhere in the township, which includes the eight feet next the fence.

Repeals road machinery law so far as road districts are concerned. Road machinery can only be purchased by township board.

Special tax for special purposes can be raised in connection with this law when desired.

All permanent work must be done according to profile on file with township clerk, to prevent one commissioner undoing the work of another, or making undesirable grades. Turnpike not less than 18 feet between side ditches, gravel or stone not less than nine feet wide, and not less than six nor more than twelve inches deep.

Persons interested in highway may improve at own expense. Highway commissioner at expense of township shall furnish grade and direct manner of grading same. If requested he shall superintend improving of road, and his per diem shall be at expense of township.

Statute labor tax, old money tax, township system of roads (Act No. 69, P. A. 1905) are all repealed, and every township in the state must and will be under this law.

The following should be executed and filed in township clerk's office with every profile of the survey establishing grade and the location of the road, as required in section sixteen of the cash tax law.

OPINION OF SURVEYOR AS TO GRADE OF HIGHWAY.

I, county surveyor of the county ofstate of Michigan, do hereby certify that I did on the.....day of.....A. D., 19...., under the direction of.....highway commissioner of the township of....., in the county of..... make a survey and measurement of a certain highway, located in the said township of....., county and state aforesaid, the center line of which is described as follows, to-wit:—Commencing
.....
.....
.....
and I did, at that time, set grade stakes along either side of said highway, at a distance of one hundred (100) feet apart, and at a distance of twenty (20) feet from the center line of said highway, from which said grade stakes the levels were taken from which the grade lines, and cuts and fills, as shown on the hereto attached profile, were computed, and it is my opinion that the grade lines as shown thereon, for the grade of the center of the highway, and for the bottoms of the side ditches, and that the cuts and fills, and the dimensions of the culverts as shown thereon, are practicable and advisable, and that the cuts and fills as indicated thereon should and ought to be made in order to es-

establish a good grade and make a permanent improvement on said highway.

Dated this day of..... A. D. 19..

Surveyor.

We, the undersigned highway commissioner and township board of the township of county of, state of Michigan, do hereby accept and endorse the hereto attached profile of the above mentioned highway, and we do hereby certify that the grade as shown thereon is satisfactory to us, and it is our opinion that the grade as shown thereon is practicable and advisable.

Now therefore, we, the said highway commissioner and the township board of the township of aforesaid, do order and determine that the grade of said highway, and of the bottoms of the side ditches, and the dimensions of said side ditches, and dimensions of culverts, and the locations of said culverts, as shown on said profile, shall be and the same is hereby established in accordance with said profile; and we further order and determine that all turn-piking shall be done according to this profile before putting gravel or stone on said highway.

Dated thisday of.....A. D. 19...

.....Highway Commissioner.

.....Supervisor.

.....Clerk.

.....Justice of the Peace.

.....Justice of the Peace.

.....Township.

ROAD DISTRICT MACHINERY.

The cash road tax law puts all road districts out of existence. The township is the successor to all the road districts that were in such township, and comprises a road district by itself. Being the successor to these districts, it owns all the machinery, gravel pits, etc., formerly owned by the districts, and owes all the money that the districts owed when they went out of existence. In case two districts were joint owners of machinery, etc., and such districts were located in different townships, then each township owns such proportion of such machinery as was owned by the district in that township, and it owes the proportion that such district owed. Uncompleted payments on machinery, etc., must be made by the whole township and the machinery is the property of the entire township.

FENCE VIEWERS.

(R. S. 1846, Ch. 18.)

The overseers of highways of the several townships in this State shall be fence viewers in their respective townships: Provided, That in townships having but one overseer of highways the highway commissioners of such townships shall also be fence viewers of their respective townships and shall act with the overseer of highways as such fence viewers whenever required.

LAST STATUTE LABOR CONVENTION.



The above cut is taken from life. Samantha "jest had to hev sum flour," so Darius drove the team as far as he could without getting stalled, and then took a bag of grist on his shoulder. On his way he passed the shade-tree, cider-jug convention, which has been called for the purpose of working out the road tax, and it isn't hard to judge from the grim expression on his face that he's saying to himself: "Make much of it, yer time's short. Nex' year ye'll be paying taxes, by Jinks, 'stead of drawin' pay fer takin' a vacation. Earle's fixed ye all right. Ye'll keep yer plows and yer road machines and yer scrapers in yer own fence corners, an' set under yer own shade trees at yer own expense, not mine, by Jinks."

LETTER TO HIGHWAY COMMISSIONER.

As the following letter answers so many questions that are being asked by highway commissioners we give it in full.

1-21-1908.

Mr. _____,

Dear Commissioner:

Your favor of the 20th inst. at hand and as I prefer to keep your letter on file I will repeat the questions so far as is necessary to a clear understanding of the answer.

1. Do they elect a commissioner and deputy or overseer (both) at each spring election? Yes, the commissioner and overseer are elected at the same time and in the same manner as other township officers at the spring election.

2. Is it compulsory for the board of supervisors to submit the question of going under the county road system at the next town meeting? No, not unless they have been petitioned by ten freeholders from each township, village and city in the county.

3. Will a commissioner have to cover his whole township in the spring before the spring election in order to report on condition of roads and bridges fixed this year and have his estimate of what should be done the coming season, if he cannot tell without to any certainty? Yes, if he is not familiar enough with his township to be able to make the estimate without driving over the roads, then he will have to make the drive.

4. Can you give me any suggestions as to cost of permanent repairs or improvements on highways? Under this heading would come any expensive bridges you might have, which of course it would be utterly impossible for me to estimate without knowing the size, etc. State reward gravel roads cost from \$800.00 to \$1,500.00 a mile with an average of \$1,200.00. The state pays to the township \$500.00 for each mile of road of this kind that is built.

5. Can a commissioner spend any more money than is appropriated for road repair and road improvement without a special election? The township board has the right to borrow, not to exceed, \$1,000.00 for repairing or rebuilding bridges in addition to what was raised but of course this amount could not be borrowed unless it was needed for such repairs, or rebuilding. If all the money has been raised in each fund that the law permits, then if this is not sufficient to keep highways in such condition as to be reasonably safe and convenient for public travel the township may levy an additional tax not exceeding five mills on the dollar of assessed valuation.

6. In case too much is appropriated for one fund or the other, can the board, upon request of commissioner, borrow from one fund and use in the other? This is unnecessary, if too much should be raised for repairs, which is improbable, the highway commissioner would have the power to use the balance in improving some of the roads. If the road improvement fund should be too large, which of course is impossible, the township board could direct what use should be made of it.

7. Is the township board obliged to value and purchase all machinery owned by the different districts in the township in the spring? No, if the machinery was purchased with the tax that would otherwise have been spent upon the roads then there is no reason why the township should pay anything for this machinery. If a special tax was assessed upon the district in addition to the regular tax and used for the purchase of machinery, then of course the district should receive some compensation for this machinery, but if it was just purchased with a portion of the money that was regularly raised for road taxes, then it belongs to the township without any payment to the district.

8. Under section 14 of the cash tax law, will the commissioner or overseer (which) have to attend to the Canada thistles and noxious weeds? The commissioner.

9. I have a ditch in this township, the waters of which are to pass through a tile in front of a man's house, but in high water it overflows (tile not being sufficient), so that it makes a dam over the tile and holds the water, and backs on another's crop until the tile draws it back down. Can you give me some advice in regard to any law covering this? The man whose crops were injured could collect for any damage he may have suffered by reason of the small tile having been put in so that the water overflows his land. The first thing the township should do is to enlarge that drain and see to it that the dam is taken away.

10. While a commissioner is sick or unable to cover his duties, as such, is he responsible personally for the overseer, who is acting commissioner in his absence? No, the overseer is an elective officer and as such is responsible for such work as he may do while the commissioner is unable to be in charge. However, the commissioner would be responsible for work he directed the overseer to do when he was himself personally able to attend to his duties. The overseer should be required to give bonds.

11. Do I understand the law to mean in case a township wishes to grade and drain the highway preparatory to putting on gravel or stone they *must* have it surveyed first? Yes, and a profile must be made and filed with your township clerk, to be kept as a permanent record.

12. Can a township put any gravel on the highways but those that have been surveyed and a profile has been made of the same? You cannot haul gravel on a strip of road and call it a gravel road until it has been surveyed and a profile made. In a whole lot of townships they are simply wasting good gravel by putting it on the road before the road has been graded and drained ready to receive it and it is to prevent this reckless waste that this section was put into the law.

13. Have all grades regardless of position got to be cut to at least a six per cent grade? No, but if they can be cut or if the obstruction can be gone around, then this should be done because it costs too much to haul loads up a steep grade to say nothing of the cost of keeping such roads in repair. Before state reward can be obtained on any road it must be reduced to a six per cent grade, so you can readily see that it is advisable to make this reduction if possible.

14. Under section 16 of cash road tax law where it says "The high-

way shall be constructed in such a manner as to form a turnpike sufficiently crowning to shed water, with gutters or ditches adequate for "drainage" does this not necessitate all grading to commence at some outlet for the water to run back from this, then the next year's work back from this and so on? This would certainly be the most sensible and practical way of carrying on the work, but you people with your well drained country will probably not have very far to go to reach the county drain or outlet of some kind.

15. To whom is it left to decide if gravel may be put on as soon as grading is completed and compacted? This is a matter that rests with the highway commissioner if the gravel is to be put on from the road repair tax and with the township board if from the highway improvement fund. In practically all state reward roads the gravel is put on as soon as the road is graded and compacted.

16a. Under section 19, in the last sentence, does it mean that a commissioner or any town officer cannot take a contract for any road work? The highway commissioner or town officer cannot bid on a contract and be awarded the contract for any job of work. However, the highway commissioner can take full charge of any road work and he need not let a contract at all under the road repair fund and he need not advertise for bids or let a contract under the highway improvement fund unless the township board directs him to. He may do any job of work not exceeding \$500 without advertising for bids.

16b. Could he not work out his own road tax? The working out of road taxes is a thing of the past, no man can work out his road tax. When a man works on the road he draws pay for the work he does and when tax collecting time comes around he pays his road tax in cash.

16c. Is he obliged to give the tax payer the preference in hiring highway work done or may he let it to whom he sees fit? I would favor the highway commissioner having a good team of horses and a man to drive them and keeping them constantly employed until the road work is done because much more can be accomplished with a man and team that are used to the work. Of course much more labor than this will have to be employed and it seems to me that I should favor employing the tax payer, provided he would work as hard and as well as the other man. Of course, the object of the commissioner is to get just as much work done at just as small a cost as he can and have it done well.

16d. How much can he spend without consulting the board? You can spend all the road repair fund without consulting the board, only be sure that you do not overdraw it. The highway improvement fund you will spend under their direction and if they tell you to do certain pieces of work you will draw what you need for that without further questioning unless you find that you will overdraw the fund.

16e. Do his account and the overseer's account for services have to be audited by the board before being paid? After the amount to be paid per day has been decided upon, then you are paid in just exactly the same way that other township officers are paid.

16f. Does their compensation include a rig and expenses or may they charge for same? This is a matter that rests with the township

board. They have authority to pay you for the rig if they wish, or not, just as they see fit.

16g. Suppose a number of teams and men quit on Saturday night and it was very important that he look up some work on Sunday, could he collect for his time (I don't believe in it)? Yes, there is nothing to hinder you drawing pay for any time you may put in. I don't believe in working Sundays myself, but I find I have to do it more or less every week.

17. Can a township board, against the wishes of the commissioner, spend the highway improvement tax anywhere they wish? Yes, the highway improvement tax is spent wherever the township board sees fit to spend it and whether you think that is the best place to put it or not, you must spend it as they tell you to. The road repair tax they have no control over.

18. How early may you do road improvement and how late in the season? The earlier, the better. April, May and June is the best time. There is nothing that says how late you may carry on this work, but if possible have it completed by the first of October or the first of November unless it might be to haul on gravel, but be sure to have your grading done by the 1st of September.

19a. You say, "Is the commissioner responsible for the acts of commissioner when both are serving?" I take it you mean is the commissioner responsible for the acts of overseer when both are serving. If he is working under your instructions you are certainly responsible and you should not permit him to do any work only under your instructions when you are physically able to see to the work yourself.

19b. Does an overseer have to give any bonds? You have the power to require an overseer to give bond with one or more sureties in such sum as you may require for the faithful performance of the duties of his office and the faithful disbursement of all moneys that may come into his hands by virtue of his office. These bonds must be filed with the township clerk and he will keep them in his office.

20a. Can a township clerk condemn a gravel pit or a piece of land known to contain good gravel and take it by law? No, we tried to get such a bill through the last legislature and would have succeeded had there been a little more time, but it was simply left behind in the rush of bills at the close of the season and so failed to pass, although there was no opposition to it.

20b. Are there any restrictions as to quality of gravel for use on highways? Only if you are building state reward roads, then you must have at least sixty per cent pebbles that will be held up on a one-eighth inch mesh screen, and which will pass through a two and one-half inch mesh screen.

Am glad to be able to give you this information. I shall hold the county road institute in connection with the farmers' institute, and I hope you will come over and bring just as many from your township as you can induce to come. This law will be thoroughly discussed there.

Yours very truly,

HORATIO S. EARLE.
State Highway Commissioner.

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STATEMENT OF A HIGHWAY COMMISSIONER REGARDING THE CASH TAX LAW.

State Highway Commissioner:

Dear Sir—Instead of getting the blank petition filled endorsing the cash tax law, we, the supervisor, clerk and myself, have talked this matter over and concluded that if it is satisfactory to you and all concerned, that I should like to explain how the tax payers feel about the new road law. I have talked with most of the men in regard to how they liked the way road work is done now. There seems to be about one-half of them who do not work on the roads that are kicking, but they usually have a reason for the kick in this way,—we have several men in this township who rent their farms. Under the old pathmaster law the party renting was supposed to work out the road tax, so the man that owned the farm got off scot free of any road tax, but now he has to pay cash. This class doesn't like it. There is another class of taxpayers who live on their farms, yet who would like the old way, for the reason that they could go out and work on the roads when they had nothing else to do, tell stories, have lots of fun and save one or two dollars in cash. Now we have the money to do business with and there is no fooling, just work, the same as any other kind of work. The old way was from eight o'clock until five o'clock, now from six till six is the time we expect to be on the move. The old way there were nineteen pathmasters and one commissioner. The pathmasters drew, or were allowed one dollar per day, the commissioner drew or was paid one dollar fifty cents per day, so you see \$20.50 was allowed the bosses if they all should be out the same day. Now one commissioner gets \$2.50 in our township. Something saved here. It cost about \$20 to get out the old road warrants and get them back in the fall, and lots of bother besides. We have worked this year all over the township about as usual under the old law, so no fault can be found about that part of the new law. We have now the paying out of money by the commissioner about as good as it can be. I like it better than any we have had heretofore. A few years ago we drew the money from the treasurer and paid the men off in cash, and drew up a receipt which the man signed at the bottom. This receipt showed at the settlement in the spring where the money went and for what. This was all right until we found a commissioner that had the men sign and then made out the orders at his leisure. So you see the point. So do not have any more of the receipt business, don't have any more pathmaster business, don't let the man who owns the farm force the man renting to pay the highway tax, for he is not interested enough to do good work. He is here this year and somewhere else next. So let it be cash tax for road work. The time has come that people must have the cash, so why not in road work as well as any other business. I have been commissioner four or five terms and I like this new law the best of all. If this is not satisfactory, send me another blank, and I will get you the names of the taxpayers."



A state reward macadam road in Chesaning township, Saginaw county. Built of limestone by county road commission.

"IMPROVING TOWNSHIP ROADS."

(Editorial from Herald-Leader, Menominee, Mich.)

"Through the efforts of State Highway Commissioner, Horatio S. Earle, one of the old relics in the highway statutes of the state has been relegated to the things of the past, having outlived its usefulness and purpose.

The office of the honored "Pathmaster" is abolished by a stroke of Gov. Warner's pen. The master of ceremonies at the obsequies was Horatio S. Earle, the man who has done more for the improvement of the roads of the state than any other.

The new law requires the payment of all highway taxes in cash, instead of by labor. Each township is made a single road district. Two funds are created, a road repair fund and a highway improvement fund. All road work shall be done under the supervision of one township highway commissioner, who shall have one assistant elected. The annual town meeting shall designate the amount to be raised for the roads, but it shall not exceed fifty cents for either fund on each \$100 valuation.

The new law is the first important step towards better township roads undertaken within recent years. The state reward law, as passed several years ago, is a very good incentive for the building of permanent gravel and macadam roads, providing that the township had the necessary funds to build the roads. But the farmers worked their highway tax under the supervision of the pathmaster, whenever they had time to do so, each one repairing a piece of road near his own home. The highway funds were empty, except in townships where a special highway tax was raised, or where large tracts of non-resident lands are located. It stands to reason, that whenever the repair work was left to the leisure of the farmers, and most of the time to their own supervision, the roads were not getting the care that their importance to the farmers and traveling public demands.

Under the new law, the supervision of building and repairing the highways will be under the care of experienced men, who will be able to devote almost their entire time during the summer months to the repair and building of roads. The townships will also have the money to do the work, and pay for it, whenever weather conditions are favorable to road building.

The old law was a good thing in the old days, when money was scarce and labor cheap, but in our days, vice versa conditions are dominant.

With this new change and the reward paid by the state for roads built according to the specifications of the state highway commissioner, the roads of the state will experience a great change for the better during the coming years."

CERTAIN POWERS AND DUTIES OF BOARDS OF SUPERVISORS.

[Extract from Act 156 of 1851.]

§ 2484. SEC. 11. The said several boards of supervisors shall have power, and they are hereby authorized, at any meeting thereof, lawfully held:

Seventh, To borrow or raise by tax upon such county any sums of money necessary for any of the purposes mentioned in this act: Provided, That no greater sum than one thousand dollars shall be borrowed or raised by tax in any one year, for the purpose of constructing or repairing public buildings, highways, or bridges, unless authorized by a majority of the electors of such county voting therefor as hereinafter provided;

Eighth, To provide for the payment of any loan made by them, by tax upon such county, which shall in all cases be within fifteen years from the date of such loan;

Thirteenth, To make such laws and regulations as they may deem necessary, and provide for enforcing the same, for the destruction of wild beasts, of thistles and other noxious weeds within the several counties;

Fifteenth, To authorize any township or townships in their respective counties, by a vote of the electors of said township or townships, to borrow or raise by tax upon such township, any sum of money not exceeding ten thousand dollars in any township in any one year, to build or repair any roads or bridges in such township or townships, or in the use of which such township or townships may be interested, and to prescribe the time for the payment of any such loan, which shall be within fifteen years, and for assessing the principal and interest thereof upon such township or townships; and if any road or bridge is situated partly in one township and partly in another, or on the line between townships, or in case any township has any particular local interest in the construction or repair of any bridge, such board of supervisors may determine, under such regulations as they may establish, the relative proportion which each township shall contribute in the building and repairing thereof, and the amount so apportioned to the several townships shall be assessed and collected in the same manner as other township taxes are now assessed and collected by law.

ENCROACHMENTS AND POLES.

AN ACT to regulate the width of public highways and encroachments thereon, and the setting of poles along such highways.

(Act No. 263, P. A. 1907.)

The People of the State of Michigan enact:

SEC. 1. All public highways for which the right of way has at any time been given or purchased for a highway sixty-six feet wide, shall be and remain sixty-six feet wide, and no encroachments by fences, buildings or otherwise which may have been made since the purchase or gift of such sixty-six feet, nor any encroachments which were within the limits of such sixty-six feet at time of purchase or gift, and no encroachments which may hereafter be made, shall give the party or parties, firm or corporation so encroaching, any title or right to the land so encroached upon.

SEC. 2. No person or persons, firm or corporation shall have the right to set a pole or poles along the line of any public highway, within twenty-five feet of the center of the highway on either side, without the consent of the township board in the township in which such highway is located and where such pole or poles are to be set; and in no case shall the poles be set within fifteen feet of the center of the highway on either side.

SEC. 3. Any party or parties, firm or corporation violating any of the provisions of this act, shall, upon demand of the township highway commissioner of the township in which such highway is located, remove such encroachments or poles. If removal be not made within thirty days after written demand be made by the said highway commissioner, then the said commissioner shall have the right to remove such encroachments or poles, and the party, parties, firm or corporation so violating, shall be liable for the amount of expense incurred in making such removal.

DIGEST.

Provides that highways which have been purchased or given sixty-six feet wide must remain so, and that no encroachments made shall give any right to the land.

Poles must not be set nearer than twenty-five feet to center of highway without consent of township board and not nearer than fifteen feet in any case.

OPINION OF ATTORNEY GENERAL RELATIVE TO ENCROACHMENTS.

"If a man move a fence, that has been an encroachment in the highway for the past fifteen years or more a distance of four feet or more, so as to make the encroachment two feet more, or a total distance of six feet, does he lose the right of claim to the four feet; and can the township highway commissioner, acting under Act No. 263, Public Acts of 1907, force him to move his fence back to the sixty-six foot line? If the owner refuses, could the commissioner move it back after giving thirty day's notice and could he force the property owner to pay the expenses of such removal?"

In our understanding of this question the property owner has secured the ownership by adverse possession of four feet of the highway, and then moves his fence two feet farther into the highway. We do not think that this action upon the part of the property owner would relinquish his ownership to the four feet which he had previously secured by adverse possession.

ACT PERMITTING HIGHWAY COMMISSIONERS TO EXPEND \$500 ON PIECE OF WORK WITHOUT LETTING CONTRACT.

SEC. 3. In all cases involving an expenditure of an amount over fifty dollars and not exceeding five hundred dollars, in the repairing or construction of roads or bridges, in any township of this state, the commissioner shall submit the proposed expenditure to the township board, and upon the approval of the said board, the commissioner may make such repairs or cause them to be made; may do the construction work or cause it to be done; may buy the necessary materials and hire the necessary help, but if the proposed expenditure is of an amount greater than five hundred dollars, the commissioner shall first submit the same to the township board, and upon approval of the said board the commissioner shall advertise for sealed proposals for the doing of such work and the making of such repairs, and together with the township clerk, subject to approval of the township board, shall contract with the lowest bidder giving good and sufficient security for the performance of the work: Provided, That in case it shall appear to the commissioner and board acting together, in such manner that it seems to them clearly shown, that there has been collusion among the bidders, they may contract privately with any one of the bidders or with some one who was not a bidder, but at a price not to exceed that of the lowest bidder. The contract so made shall be approved in writing by the supervisor in order to be valid as against the township. Not less than ten days' notice shall be given by the commissioner of the time and place of letting such contract by putting up notices in at least five of the

most public places in his township. Upon performance of the work by the contractor, if approved and accepted by the commissioner and supervisor, there shall be drawn and signed by such commissioner, and countersigned by the township clerk, orders upon the township treasurer for the amount of said contract. It shall be unlawful for any township officer to be in any way interested directly or indirectly in any such contract. Any contract in which any such township officer is so interested shall be absolutely void.

DIGEST.

Raises amount that highway commissioner may expend on a piece of work without advertising for bids and letting contract, from \$50 to \$500.

Township officials cannot be interested in any way in contracts let. Any contract so let is void.

INTER-TOWN ROAD AND BRIDGE LAW.

AN ACT to provide for building, rebuilding or repairing of bridges and roads situated in more than one township, or partly in one township, or more than one, and partly in a city or incorporated village, when any such township, city or village shall fail to join in or contribute to the building or repairing thereof.

(P. A. 1905, Act 306.)

SECTION 1. Whenever any township, city or such incorporated village as mentioned hereafter in this section, shall be desirous of having a bridge or road constructed, which would, when constructed, be in more than one township, or be partly in one township or more than one, and partly within a city or an incorporated village, or of having any such road or bridge rebuilt or repaired, and any such township, city or village, shall fail upon request to join in building, rebuilding or repairing such bridge or road or to contribute its just share to the building, rebuilding or repairing thereof, any such township, city or village desiring the building, rebuilding or repairing of such bridge or road may, by its township board, its common council or village council, as the case may be, by petition, in the form of a resolution or otherwise, apply to the board of supervisors of the county for an order for the construction, rebuilding or repairing of such bridge or road, and for fixing the respective proportions which each township, city and village shall contribute for the construction, rebuilding or repairing of such bridge or road and for keeping the same in repair, as well as for deciding the kind of bridge or road to be constructed.

SEC. 2. Unless such petition is to be presented to the annual meeting of said board of supervisors, or at an earlier meeting already appointed by the board, to be held at least thirty days prior to such annual meeting, it may contain a request for a special meeting of said board, and may be delivered to the clerk of said board, who shall have authority, and whose duty it shall be, to call a special meeting of said board not

more than twenty nor less than ten days from the time he shall receive the petition, and it shall be his duty to inform all the members of said board to be found in the county, of such meeting, and the purpose thereof, at least five days before such meeting is to be held. And at whatever meeting such petition is to be heard and it shall be the duty of such petitioners to give notice, in writing, to the township board of each township named and to the common council of any city, as well as to the village council of any village named, of their intention to ask for the hearing of the same at such meeting, and of the purpose thereof, which notice shall be delivered to the clerk of every such township, city or village, and if such clerk is not readily found, then to any member of the township board, or the mayor, or some member of the common council of the city, or a member of the village council, as the case may be, at least seven days before said board is to be asked to hear said petition.

SEC. 3. At such meeting said board of supervisors shall have power, and it shall be their duty, to grant or refuse the prayer of said petition. And if they shall grant the same, they shall describe the kind of bridge or road to be built and the limit of cost which it shall not exceed, and for the purpose of facilitating their determination of the kind and cost of the bridge or road or the building or repairing thereof, each township, city and village named in the petition may present a plan or plans and specifications of such proposed bridge or road or the building or repair thereof, with or without drawings, and an estimate of each as to cost. Said board shall also determine the quota or proportion which each township, city and village named shall contribute thereto, and whether the whole amount shall be raised the first year or a part, and what part the first and what part the second year, but no part of it shall be deferred more than two years. They shall also determine the quota of each, towards keeping the same in repair, which shall remain the same till altered by said board, or by the consent of each township, city and village, which is a party to this proceeding.

SEC. 4. Upon determining that such bridge or road shall be built, rebuilt or repaired and the other matters mentioned in the preceding sections, then said board of said supervisors shall order the county treasurer to open an account with each township, city and village, whose quota they have determined, under the designation of "bridge or road fund" (naming the bridge or road), charging to each the quota so assigned by the board, which order such treasurer shall be bound to obey; and such board shall thereupon, through their clerk, within five days after such order, serve a copy of the same upon the officer and all officers of each township, city and village authorized by law to assess township taxes in such township, city taxes in such city, and village taxes in such village, as well as upon the clerk of each respectively, and upon the officer or officers in each township, city and village named, authorized by law to collect such township, city or village taxes respectively; and thereupon such assessing officer or officers shall be bound to assess, and such collecting officer to collect in such several townships, city and village, respectively, the taxes for the same assigned to each respectively as its quota for the year in which, by the order of the board, the same is to be raised and this they shall proceed to do without the necessity of waiting any order therefor from any township, city or village authority. But each of said collectors shall, before proceeding to collect any

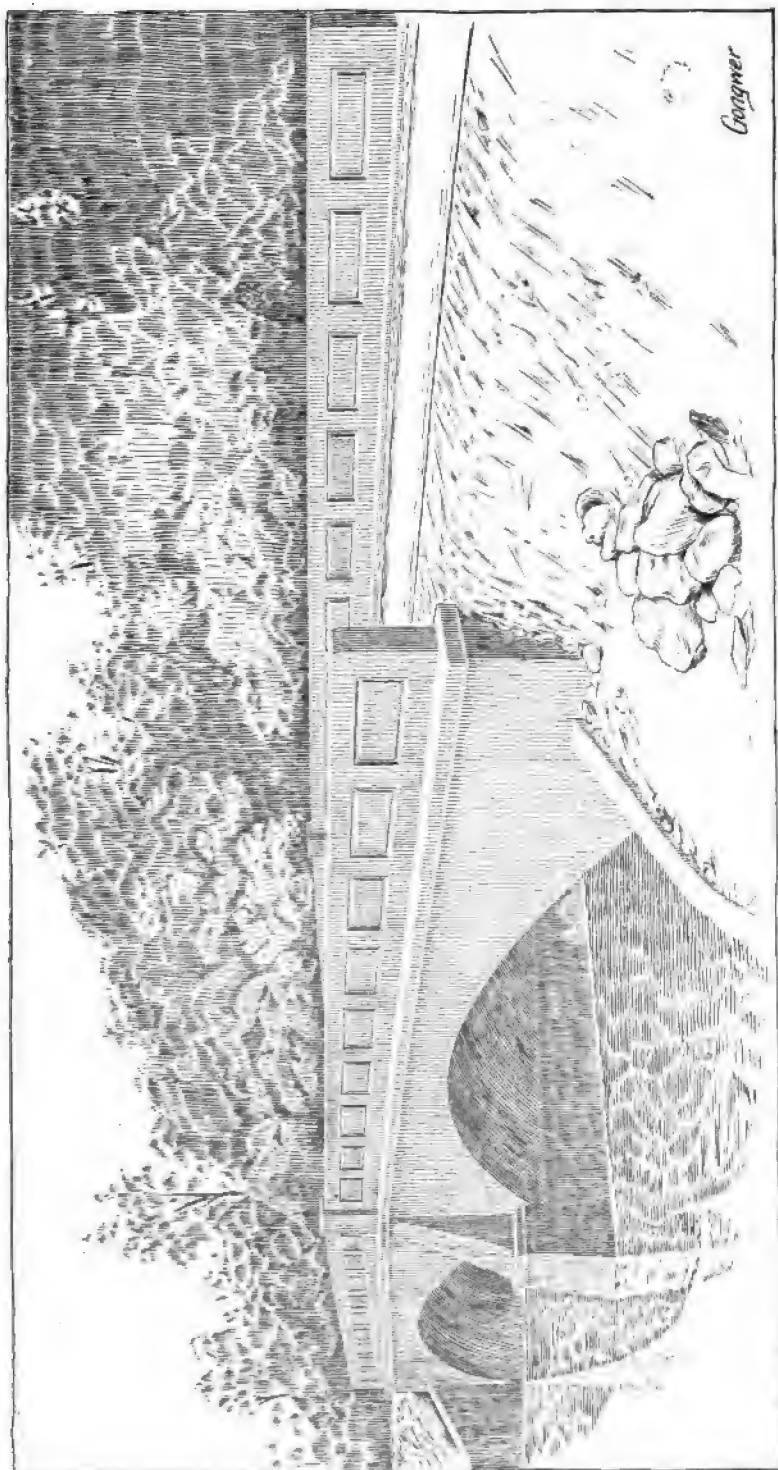


Fort road, Ecorse township, Wayne county. Tar-veneer macadam road built by county road commission.

such tax, give to the county treasurer a bond, with at least one good surety, in double of the amount of such tax to be collected by him for the year, and such collectors shall each be entitled to the same percentage or compensation as allowed by law for collecting township, city or village taxes respectively, which may be added to the tax by the collector if not included in the amount assessed. And the board of supervisors shall issue their warrant to each of said collecting officers for the collection of such taxes and require each to pay over the respective amounts to the county treasurer to apply on such bridge or road fund, which warrant shall give to each of said collecting officers the like powers and impose the like duties as are or may be given to or imposed upon those collecting township taxes except as herein otherwise provided. Each of such collectors shall, as required by his warrant, pay over all funds collected, to the county treasurer and take his receipt therefor.

Sec. 5. Said board of supervisors may, as a board or through a committee of three of their members as their agent, at any time after they have made the order for raising such bridge or road fund by taxes as in their opinion the public convenience require, contract for the building, rebuilding or repairing of said bridge or road as an entirety, or for any material or labor for the same if they should prefer to build, rebuild or repair it without contract as a whole (in which case they or their committee may employ an overseer) but in all cases to be payable only out of said bridge or road fund when and as collected. If the building, rebuilding or repairing of the bridge, including materials, is let by contract, notice for not less than three consecutive weeks of the time and place of letting shall be published in some newspaper printed in the county, if any, or if none is published in the county, then by written or printed notice posted for at least three weeks in three of the most public places in each township, city or village named in the petition of the time and place at which contract shall be let. The board also, as such, or through its committee of three acting as its agents, shall determine the amount and time when partial payments shall be made when this has not been fixed by special contract, as well as to determine when and whether such bridge or road or the building, rebuilding or repair thereof is completed according to the plan or according to contract. But if the township board of each township and the city or village council of each city or village, in behalf of which it was built, shall admit to such board or its said committee and agents, its full completion, this shall be conclusive of the question.

Sec. 6. The board shall cause to be kept by its clerk a full account of all expenses to the county in carrying this act into effect in any such case, and when the bridge or road or the rebuilding or repair thereof is completed, they shall through their clerk, certify such amounts to the county treasurer, who shall charge in the account of such bridge or road fund to each township, city, or village, its quota, in the same ratio established by the board for the bridge or road; and this amount together with any balance of the bridge or road fund unpaid shall be raised by tax by the order of the board in each township, city and village named, by tax to be assessed, collected and paid by the same officers and in the same manner as above required for the construction, rebuilding or repairing of said bridge or road.



COST OF BRIDGES AND CULVERTS BUILT IN MICHIGAN IN 1907.

County.	Bridges.				Culverts.					Total.
	Concrete.	Steel.	Wood.		Concrete.	Iron.	Steel.	Tile.	Wood.	
Alcona.....		\$3,094 30	\$265 00		\$32 00		\$195 00		\$129 00	\$3,715 30
Alger.....		3,045 00					212 00		57 20	3,314 20
Alcona.....	\$6,349 17	3,300 00	462 50		4,598 19	\$505 00	621 90		119 50	15,956 26
Alcona.....		74 00	30 00		30 00		329 55		214 45	1,548 95
Antrim.....	418 00		212 50		96 00	90 00	156 25	\$206 00	371 30	1,550 05
Arenac.....	265 00	10,270 20	158 00		250 00	60 00	963 30		177 50	12,144 00
Baraga.....			25 00				192 00		87 50	304 50
Barry.....	605 00	371 00			918 75	717 00	444 25	70 00	90 00	3,216 00
Bay.....	1,470 00	625 00	351 64		2,137 50		1,061 00	496 35	595 00	6,738 49
Benzie.....		600 00			603 88		158 00	50 00	158 00	1,569 88
Berrien.....	2,511 65	11,338 72			586 00		1,618 16	11 74	230 00	16,296 27
Branch.....	5,008 80	5,362 00	90 00		1,935 11	732 00	397 05			13,524 96
Calhoun.....	6,405 60	6,707 80			648 72	109 08	440 75	94 30	5 10	14,410 75
Cass.....	1,010 56	220 29			863 03	207 00	276 25		8 00	2,584 83
Charlevoix.....	375 00		50 00		610 00			199 80		1,234 80
Cheboygan.....		2,750 00	181 00		143 00	236 00	345 00	310 00	263 00	4,298 00
Chippewa.....		5,275 00	466 50						492 00	6,233 50
Clare.....	406 00	1,029 00	103 00		116 70		424 00	490 00	193 00	2,761 70
Clinton.....	3,456 77	2,866 06	176 65		3,956 22	665 75	2,251 41			13,572 85
Crawford.....		140 00			151 00				33 00	324 00
Delta.....	3,670 00	1,605 00	320 00		35 00		459 40	95 00	347 80	6,532 20
Dickinson.....	240 00								84 00	324 00
Eaton.....	2,005 00	1,793 61	78 50		1,036 60	721 20	1,397 16		26 00	7,058 07
Emmet.....	2,015 00	323 00	214 50		103 00	64 40		216 00	138 00	3,073 90
Genesee.....	5,575 00	602 00			4,100 00	1,229 00	742 00	73 90		2,321 90
Gladwin.....	103 00	4,460 00	75 90		327 50	54 60	364 00		164 00	5,549 00
Gogebic.....	1,561 77		261 00		450 00				85 00	796 00
Grand Traverse.....	8,636 35	7,445 00	211 15		2,339 34	136 40	971 10		10 00	1,626 64
Gratiot.....	4,762 81		50 00		2,500 34	285 62	75 00	145 00	57 38	19,739 34
Hillsdale.....										7,866 05
Houghton.....		4,840 00	931 00		9,364 98			324 00	396 00	6,491 00
Huron.....	5,128 81	5,927 20	225 00				974 00	221 00	627 00	22,467 99
Ingham.....	76 80	3,130 00			789 00	400 00	2,340 00	32 00	32 00	6,799 80
Ionia.....	3,230 00	12,890 00			5,180 00		852 00			22,152 00
Iosco.....		1,799 11	98 60		272 26	88 30	753 55	244 50	39 00	3,295 32

STATE HIGHWAY DEPARTMENT

COST OF BRIDGES AND CULVERTS BUILT IN MICHIGAN IN 1907.—Continued.

County.	Bridges.				Culverts.					Total.
	Concrete.	Steel.	Wood.		Concrete.	Iron.	Steel.	Tile.	Wood.	
Iron.....					\$112 00		\$245 00		\$312 00	\$2,054 00
Isabella.....	\$4,442 00	\$1,035 00	\$350 00		3,650 94	\$38 25	172 00	\$444 48	282 00	16,327 67
Jackson.....	2,330 00	7,298 00			202 00	348 00	608 00	26 50	53 00	5,015 50
Kalamazoo.....	5,160 00	3,100 00	96 00		1,340 00				26 70	9,722 70
Kalkaska.....	435 00	240 00	20 25		218 32	40 00	94 00	111 26	20 25	1,179 08
Kent.....	1,507 00	8,335 00	614 00		4,550 00	236 50	1,960 00	20 90	57 50	17,280 90
Keweenaw.....			620 00		30 00			485 90	65 00	1,200 90
Lake.....	90 00	1,565 50	26 00		265 00		353 00		120 00	2,419 50
Lapeer.....	2,443 50	2,877 65	638 92		6,628 97		1,137 00		148 49	13,874 53
Leelanau.....								221 10	22 00	243 10
LeNawee.....	5,552 64	7,575 46	90 00		6,975 34	1,278 51				21,471 95
Livingston.....	1,959 07	740 61	195 00		2,528 02	52 00	782 56			6,257 26
Luce.....			17 00				495 00		35 00	547 00
Mackinac.....		175 00			150 00		16 00		124 00	465 00
Macomb.....	5,335 36	5,563 56	715 00		4,671 15		46 11	52 26	250 00	16,635 44
Manistee.....	131 90	44 00	235 00		459 70		99 16		43 00	1,147 01
Marquette.....	1,110 00	750 00	297 25		300 00		1,220 00	134 25	155 00	3,832 25
Mason.....	940 60	1,370 00	116 40		274 30		937 80	160 05		3,669 15
Meosco.....	188 00	2,578 80			2,201 20	377 00	350 15	77 89		5,573 04
Menominee.....		3,950 00	503 00		1,364 00		1,242 00		70 00	7,129 00
Midland.....	6,943 45	13,596 75	200 00		3,634 45	416 80	433 14		111 00	25,595 59
Missaukee.....	385 80				77 20		1,098 49	13 60	25 00	1,600 09
Monroe.....	1,309 00	6,296 30	242 66		9,863 12	100 00		85 25		17,896 33
Montcalm.....	4,121 75	2,885 88	150 00		4,675 26	402 25	733 20			12,968 34
Montmorency.....					325 00			11 00	35 00	371 00
Muskegon.....	397 75	836 00	145 55		842 77	671 00	932 00	6 20	221 57	4,052 84
Newaygo.....	3,400 00		355 00		3,155 00	457 00	950 00	104 00	167 00	8,588 00
Oakland.....	7,940 00	1,848 00	52 00		4,070 00		888 00	26 00	137 00	14,961 00
Oceana.....	3,292 16	1,26 58	100 00		2,562 80	219 20	534 65		88 50	6,923 89
Ogemaw.....	441 00	1,123 00	166 00		758 00		595 00		626 15	3,709 15
Ontonagon.....		2,055 00	787 50		1,780 00	13 60	1,106 00		695 00	3,537 50
Oscoda.....	1,861 00	1,210 00	53 40					218 00	497 00	6,739 00
Oscoda.....						154 00			117 00	1,166 00
Otego.....		1,012 00								
Ottawa.....	1,635 00	6,765 80	295 00		2,667 60		1,799 00	96 40	200 00	13,458 80

Presque Isle.....	65 00	2,775 00	138 18	527 50	.....	53 00	50 00	164 38	3,773 06
Roccommon.....	.....	.....	474 00	.....	.....	207 50	.....	203 20	884 70
Saginaw.....	872 93	24,781 00	249 00	4,148 16	120 28	337 00	94 93	438 17	31,041 47
Sanilac.....	5,800 32	7,716 55	931 70	11,502 31	.....	3,247 04	.....	410 00	29,607 92
Schoolcraft.....	.....	.....	.....	27 00	.....	105 70	.....	399 00	531 70
Shiawassee.....	3,157 60	736 30	.....	2,712 50	.....	1,555 25	.....	.....	8,161 65
St. Clair.....	4,280 00	4,200 00	314 00	14,710 00	.....	157 00	14 50	174 00	23,849 50
St. Joseph.....	6,445 00	1,200 00	.....	245 00	197 50	80 00	37 00	101 50	8,306 00
Tuscola.....	6,261 92	2,705 80	.....	7,792 76	.....	250 00	.....	70 00	17,080 48
Van Buren.....	1,180 08	1,600 35	.....	2,577 35	.....	315 75	130 00	.....	5,803 53
Washtenaw.....	3,913 00	1,944 29	.....	3,442 42	170 00	284 50	.....	104 09	9,858 30
Wayne.....	4,473 02	5,567 79	538 30	3,302 85	.....	830 60	142 10	617 00	15,471 66
Wexford.....	2,090 25	.....	.....	618 94	90 00	1,293 90	70 00	.....	4,163 09
Total.....	\$166,866 39	\$242,311 20	\$14,867 55	\$166,513 03	\$11,738 01	\$46,358 58	\$6,113 16	\$12,615 23	\$667,383 15

GENERAL SPECIFICATIONS FOR HIGHWAY BRIDGES.

Location.

The bridge referred to shall be located, both as to line and grade, as specified in notice of letting and staked out by the highway commissioner or his engineer. It will consist of spans, and have a clear roadway of feet.

Loading.

The bridge shall be designed to carry in addition to its own weight, one hundred pounds per square foot of moving load, starting at one end and moving over until the whole span is covered the entire width of the roadway. In addition the floor system must be proportioned to carry a twelve-ton steam road roller, and so designed that under any of the above conditions of loading, no member shall be stressed more than 15,000 pounds for each square inch of effective cross-section.

Materials.

The whole of the superstructure, except as herein specified and noted on the accepted plans, shall consist of open hearth medium steel; provided, however, that rivets and bolts shall be of soft steel, and adjustable members of either soft steel or wrought iron. Cast iron will not be allowed except for ornamental work and places not subject to varying stresses. Cast steel shall be employed wherever important castings are necessary.

Quality.

Medium steel must have an ultimate tensile strength of from 60,000 to 68,000 pounds per square inch and an elastic limit of one-half that amount. Under test it must show an elongation of 22% with a reduction in area of 40%. Test bars when bent, either cold or hot, must be capable of being bent 180 degrees and closed down upon themselves flat without a sign of fracture and must be capable of standing the usual punching and drifting tests. Broken pieces of steel must show a silky fracture of uniform color. Soft steel shall show an ultimate tensile strength of from 50,000 to 58,000 pounds per square inch. Cast iron shall be of tough grey iron, free from cold shuts, or blow holes, true to pattern and of workmanlike finish. Cast steel shall be true to form and dimensions, of workmanlike finish and free from injurious blow holes or other defects. The metal must be uniform in character, free from hard or soft spots and capable of being properly tool-finished. Lumber, if used for flooring, shall be of and shall be sawed true, full size, out of wind, free from wind-shakes, large or loose knots, worm holes or other defects impairing its strength or durability.

Type of Bridge.

No pin-connected trusses shall be used for spans under 100 feet in length. Warren girder riveted trusses will be given preference for spans between 60 and 100 feet in length. Plate girders will be given

preference for spans between 30 and 60 feet in length. Rolled I-beams, single length stringer bridges will be used for all spans under 30 feet in length.

Sizes of Metal.

No metal in any bridge shall be used for I-beams, channels, angles or plates having a less thickness than five-sixteenths of an inch.

Workmanship.

All work, both in shop and in field, must be first class and equal to that specified for first class bridges. No defective work, or work showing faulty material will be accepted. All abutting joints must be milled to exact length and at right angles to the lines of stress. Riveted joints must be proportioned with the required number of rivets and made as strong, excluding friction, as any of the working members jointed. The various pieces forming any member must fit exactly together and each member must be free from bends, twists and open joints.

Rivets.

The working value of rivets shall be taken as the diameter of the rivet, times 12,000 times the thickness of the thinnest plate, in inches.

Rods.

Adjustable rods with screw ends must be upset before threading, so that the diameter measured from the bottom of the threads is as great as that in the plain part of the rod.

Eye-Bars.

Eye-bars shall be so proportioned and made that the bars will break in the body of the bar instead of at any part in the head or neck.

Pins.

Pins shall be turned straight and smooth, and for the chords shall fit the holes within one-fiftieth of an inch. The shearing stress in pins shall not exceed 10,000 per square inch.

Inspection.

All material shall be subject to inspection by the highway commissioner, the township board or any engineer employed by them for that purpose. The contractor shall furnish all necessary facilities for making tests and inspection called for in these specifications.

Erecting.

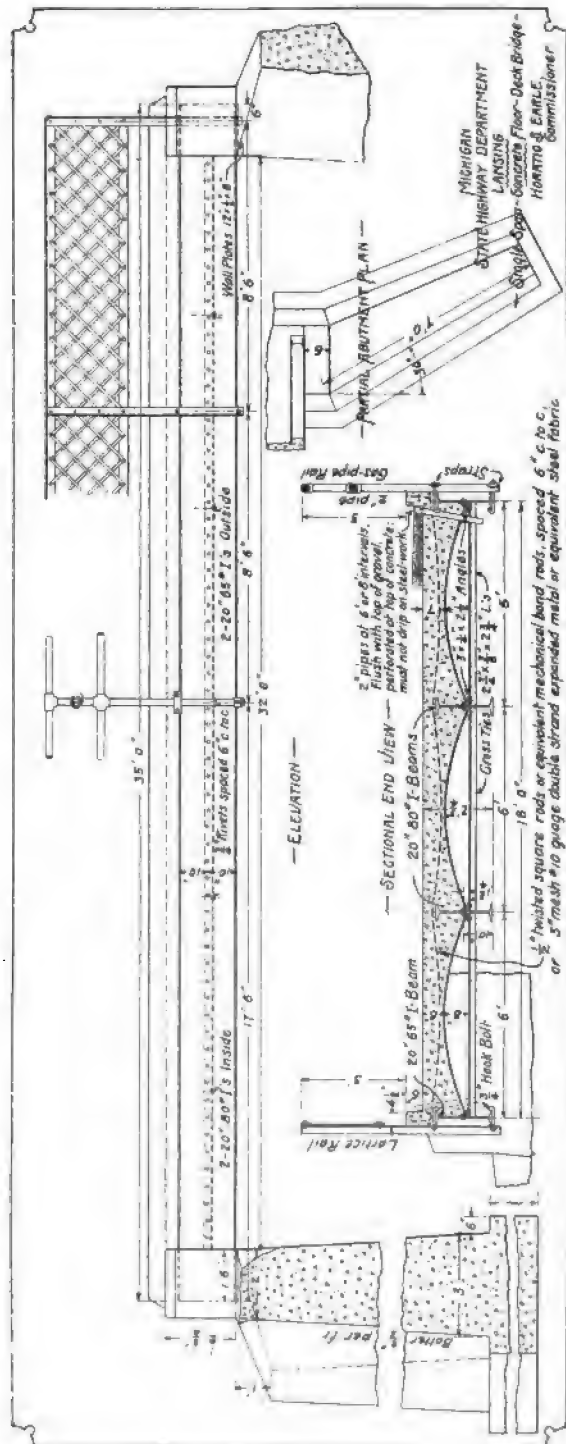
The contractor will furnish all tools, false work, etc., necessary to erect the bridge and shall remove all obstructions caused by this part of the work, and leave the bridge ready for travel.

Floors.

All bridge floors shall be supported by steel stringers securely fastened with rivets or bolts to the floor beams and the abutment walls. Rivets shall be used insted of bolts where possible.

Plank Floors.

Plank floors, if used, shall be securely spiked to nailing strips which



must be bolted to the sides of the steel stringers. On the sides of the bridge, felloe-guards of 6-inch by 6-inch timber will be securely bolted to the floor planks.

Concrete Floors.

Concrete floors will be supported on the lower flanges of the steel I-beam stringers by means of corrugated metal arches, or other acceptable forms and the concrete laid on to a depth of at least six inches over the crown of the arches, and to a depth of two inches over the tops of the I-beams. Stringer beams shall not be spaced wider than three feet center to center unless some approved form of reinforcement is used in the floor. The cement used shall be an approved brand of Portland cement capable of filling all the requirements for cement in the specifications approved by the United States army engineers. If rock concrete is used it shall be proportioned—one part cement, two parts sand and four parts stone. The stone shall be crushed to pass through a one-inch ring. If gravel concrete is used it must contain, or be mixed so as to contain, enough, or slightly more than enough, sand to fill the voids in the pebbles, and shall be mixed one part cement to four parts of gravel. No gravel shall be used that will not pass a one-inch ring.

The mixing must be thorough, and enough water added to make wet concrete (about the consistency of thick milk gravy), which must be carefully worked into all crevices and angles and particularly well around any reinforcing metal that may be used.

Abutments and Retaining Walls.

Concrete for abutments and retaining walls shall be of the kind above specified, except where stone concrete is used the mixture may be one part cement, two parts sand and five parts stone. The stone must be crushed to pass through a two and one-half inch ring. Where gravel concrete is used the mixture may be one part cement to five parts of gravel. No gravel shall be used that will not pass through a two and one-half inch ring. Rubble concrete may be used if the stones are carefully bedded in the concrete so that no two stones touch each other, the concrete being carefully worked into the spaces between the stones. Large stones should be placed rack-and-pinion fashion, and no stone should be laid closer than two inches from the outer faces of the walls.

Painting.

The whole of the steel work shall be scraped clean from rust and scale and given one coat of an approved linseed oil paint before leaving the shop. In riveted work all pieces coming in contact shall be extra well painted before being riveted together. Pins, bored pin holes and all turned or polished surfaces shall be coated with white lead and tallow before leaving the shop. After erection the metal work shall be thoroughly cleaned from mud, grease and other objectionable matter and given two coats of linseed oil paint. The three coats of paint given the metal shall be of distinctly different shades of color. The paints shall be of such color and quality as may hereafter be determined by



A flat-top, I-beam, concrete floor bridge on Fort road, Wayne county. Built by county road commission. Note the capacity provided for by span of bridge. An arch bridge would have necessitated raising grade of road.

the commissioner, provided, however, that it shall not cost more than \$..... per gallon. Each coat must be allowed to dry thoroughly before the next coat is applied. Extra effort must be made to have the brush reach all angles, joints and concealed places, so that every particle of metal shall be well coated.

Changes in Contract.

The commissioner and township board reserve the right to make any changes in the specifications and plans that they jointly deem advisable. Should any additional material or labor be required the contractor will be paid for furnishing the same. On the other hand, should such changes reduce the amount of labor or material required in the bridge as now designed, the contractor shall sustain an equivalent reduction in the contract price. No claim will be allowed for extra material or labor unless officially ordered as provided.

The basis for estimating the value of the increased or diminished labor and material shall be the average cost of similar labor and material in the accepted contract for the bridge.

References.

Any questions that may arise as to the quality of material and labor that are not covered by these specifications shall be settled in accordance with the provisions of Theodore Cooper's Specifications for Steel Highway Bridges, under Class B-1.

CONCRETE BRIDGE FLOORS.

Concrete bridge floors may be made in slabs or solid in the form of arches between the I-beams, overlapping on top of the beams.

If the floor is made of concrete slabs the I-beams should have tie-rods put in, two and one-half inches below the top of the floor, but if a solid floor is made, then these rods should be put in near the bottom of the beams, to withstand the arch thrust.

All concrete slabs should have steel reinforcement. Always fill in between the I-beams on the top of the abutments with concrete. Be sure and leave no crevices where water can get in and rust the beams.

To make the concrete, use one part Portland cement, two parts sand and four parts broken stone or clean gravel not exceeding one inch in diameter. The upper inch of the slab or concrete floor is better if made of one part cement, one and one-half parts sand and three parts stone or gravel, so as to make it less pervious to water.

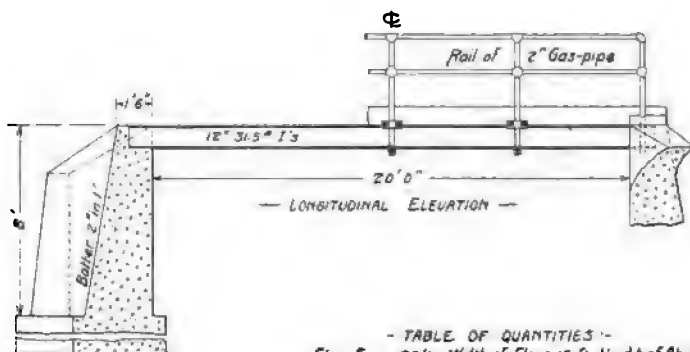
A layer of gravel not less than six inches thick should be put on top of the concrete floor to protect the concrete. This gravel should be what is commonly called "good packing gravel."

The following table shows the sizes and weights of I-beams which are sufficient to bear up a ten ton traction engine besides the concrete floor and gravel covering. The lengths given are for the exact distance between abutments, and they should be enough longer to give sufficient length to rest on the abutments.

TABLE SHOWING SIZES AND WEIGHTS OF I-BEAMS TO BE USED FOR VARIOUS LENGTHS OF SPAN FOR BRIDGES OR CULVERTS, USING CONCRETE FLOORS, OR STONE OR CONCRETE SLAB FLOORS.

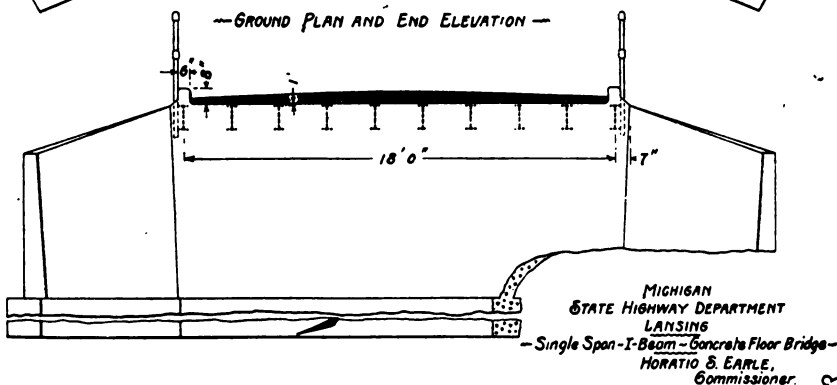
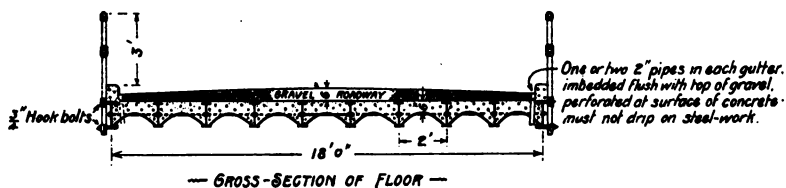
Depth of I-beam. Inches	Width of Flange in Inches	Weight of I-beam per foot of length. Pounds	Thickness of Web of I-beam. Inches	Limiting Lengths of Span.	
				I-beams spaced 2 feet between centers	I-beams spaced 3 feet between centers
5	3	9 3-4	0.21	4' 6"	3' 8"
5	3 1-8	12 1-4	0.36	5' 0"	4' 0"
5	3 5-16	14 3-4	0.50	5' 6"	4' 0"
6	3 5-16	12 1-4	0.23	6' 0"	5' 0"
6	3 7-16	14 3-4	0.35	7' 0"	5' 6"
6	3 9-16	17 1-4	0.48	7' 6"	6' 0"
7	3 11-16	15	0.25	8' 0"	7' 6"
7	3 3-4	17 1-2	0.35	9' 0"	7' 6"
7	3 7-8	20	0.46	9' 6"	7' 6"
8	4	18	0.27	11' 0"	8' 8"
8	4 1-16	20 1-2	0.36	11' 9"	9' 0"
8	4 3-16	23	0.45	12' 0"	9' 6"
8	4 1-4	25 1-2	0.54	12' 6"	10' 0"
9	4 5-16	21	0.29	13' 0"	11' 0"
9	4 7-16	25	0.41	14' 6"	11' 6"
9	4 5-8	30	0.57	15' 6"	12' 6"
9	4 3-4	35	0.73	16' 6"	13' 6"
10	4 11-16	25	0.31	16' 6"	13' 6"
10	4 13-16	30	0.46	17' 6"	14' 0"
10	4 15-16	35	0.60	18' 6"	15' 0"
10	5 1-8	40	0.75	19' 6"	16' 0"
12	5	31 1-2	0.35	21' 0"	17' 0"
12	5 1-16	35	0.44	21' 6"	18' 0"
12	5 1-4	40	0.46	22' 6"	19' 0"
15	5 1-2	42	0.41	27' 0"	23' 6"
15	5 9-16	45	0.46	28' 6"	23' 6"
15	5 5-8	50	0.56	29' 6"	24' 6"

The figures in heavy type indicate the economical sizes to use.



— TABLE OF QUANTITIES —

Clear Span, 20 ft. Width of Floor, 18 ft; Height of Abutments, 8 ft.
 Capacity 150⁰ per sq ft. uniform live load, or 15 Ton Road Roller.
 10 Lines 12" 31.5" Steel I's 22 long - Weight 6820⁰
 3 Gross lines Tie Rods 250⁰
 2" Gas-pipe Railing-125 ft. with 4 L's, 6 + 's and 10 T's
 Corrugated Steel Floor Supports *20 gauge - 360 sq. ft;
 Concrete: Floor with felloe guards, 10.5 cu. yds
 Abutments and Wings, assuming 18 footing, 49.2 cu yds.
 Gravel on Floor 6 4 cu yds.



MICHIGAN
 STATE HIGHWAY DEPARTMENT
 LANSING

— Single Span - I-Beam - Concrete Floor Bridge —
 HORATIO B. EARLE,
 Commissioner.

CREOSOTE WOOD BLOCK BRIDGE FLOORS.

There are some bridges which are not strong enough to hold concrete floors with the necessary gravel covering and the possible loads. These would hold a two-inch plank floor with creosote wood blocks on top, and it would make a most excellent floor, very much more durable than an ordinary plank floor.

CONCRETE ARCH CULVERTS.

The concrete arch culvert is, to a very great extent, replacing the old form of timber structure. While somewhat more costly in the first instance, yet it is, if rightly constructed, a permanent work, and as such, will in a few years, effect a considerable saving in road expenditure. The greater portion of the annual road appropriation is, in many townships, spent in repairing and rebuilding wooden culverts and sluiceways. The life of timber in this work is very short. Wooden culverts are quickly upheaved by frost, warped by the sun, and decayed by moisture. Wherever concrete culverts have been fairly tested they give satisfaction, and their general use by a township will mean, in the course of a few years, a marked reduction in the cost of this branch of road work.

The stone arch is designed on the principle that it will remain in place without the use of mortar. The concrete arch, on the other hand, is a monolith, dependent upon its cohesive strength. That the concrete arch is dependent upon cohesive strength points to the necessity in construction, of a generous proportion of cement, very great care in mixing the concrete, and a good quality of all materials employed.

A concrete can best be regarded as a mixture of mortar and broken stone, the mortar being formed from a mixture of sand and cement. Given a small quantity of broken stone in a vessel, the requisite amount of mortar can be gauged by pouring water into the vessel until the stone is submerged. The quantity of water used will indicate the amount of mortar required to completely fill the voids in the stone. The proportionate amount of cement needed to fill the voids in the sand can be gauged in the same way. The proportions of cement, sand and broken stone obtained in this way would provide, with perfect mixing, a mortar in which the voids in the sand are filled with cement, and each particle of sand coated with cement; it would provide a concrete in which the interstices of the stone are filled with this mortar, and each stone coated with mortar. This would be the case with perfect mixing and would provide a theoretically perfect concrete. Perfect mixing is not possible, however, and it is necessary to provide an

amount of cement in excess of the voids in the sand, and an amount of mortar in excess of the voids in the stone.

With proper mixing and good materials, a satisfactory concrete for bridge abutments can be formed from cement and broken stone, in the proportions of one part cement, two parts sand and four parts broken stone. It is recognized that the greatest strength in concrete can be obtained by making the mortar rich in cement, rather than by lessening the quantity of stone, but beyond providing for a strong adhesion of mortar and stone, little is gained by making the mortar materially stronger than the stone. This applies to crushing strength rather more than to the tensile strength required to some extent in the arch. For the arch proper it will be well to use a richer concrete, in, say, the proportions of one of cement, two of sand, and three of broken stone.

The cost of the abutments may be lessened, where they are of sufficient thickness, by the use of rubble concrete. The casing or curbing must be built up as the laying of the concrete proceeds. Within the casing and firmly tamped against it, there should be placed fine concrete to a thickness of about six inches. This will form a shell for the abutment, inside of which large stones may be placed in rack-and-pinion order, ends up. There should be a space of at least two inches between the stones filled with fine concrete, and all firmly rammed. The outer shell of fine concrete should always be kept built up six inches or so in advance of the rubble work. The rubble should be laid in layers and each layer well flushed with a layer of fine concrete.

The lumber used in making the curbing or casing should be dressed, tightly fitted and firmly braced, so that the concrete may be well rammed into place. The framework should be closely boarded up against the work as it proceeds. The centering for the arch should be well formed. The ribs should not be farther than three feet apart. The lagging should be three inches thick and dressed to the intrados of the arch. All the framework, centering and supports should be substantial and well constructed. This framework is a considerable item of expense in the building of a culvert but it can be used as often as it may be required for arches of similar span. The exterior of the culvert, when finished, should have a smooth face, free from holes, and a surface grouting, which is of little use, should not be necessary.

There is some difference of opinion as to the relative strengths of gravel and broken stone in concrete. The natural inference is to suppose that a rough, irregular surface will secure greater adhesion than one that is smooth. However that may be, there is little reason to doubt that gravel will make a good concrete, but there is a right and wrong way of using gravel. It is not uncommon to find gravel just as it is taken from the pit, and cement mixed to form a concrete. Remembering the proper composition of a concrete and placing beside this the fact that gravel usually contains sand, but not in any definite proportions, and that some pockets of "gravel" may be almost complete sand, while in the layers adjoining there may be little if any sand, and that many gravel beds contain much clay or earthy material, it will be readily understood why it is, that in some cases, concrete mixed in this way may be successful, yet it will always be uncertain and

hazardous. The only safe method is to separate the stone and sand composing the gravel by screening, then to mix cement, sand and clean stone uniformly and in their right proportions.

The concrete should be mixed at a point convenient to the work, in a box which is sometimes specified as water-tight, but the concrete will quickly make it so. It should be mixed in just such quantity as is required, and a constant stream kept passing to the work. It should be laid in layers, and each layer thoroughly rammed until moisture appears on the surface.

It is very necessary to see that the sand and stone used in making the concrete are clean, that it is free from clay, loam, vegetable or other matter which will act as an adulterant, and result in a weak and friable concrete. If such matter is intermixed with the stone, it is well to flush it away with a good stream of water. Large stone used in rubble concrete should be also treated in this way. It is well, particularly in hot weather, to dampen the stone before mixing it with the mortar. The heat of the stone in hot weather causes the moisture of the mortar to evaporate, causes it to set too quickly, and at all times there is more or less absorption from the mortar in immediate contact with the stone unless the stone, as intimated, has been dampened.

When the work ceases for the day, or is for other reasons interrupted, the surface of concrete should be kept damp until work is resumed. When work is in progress in hot weather, any exposed surfaces should be kept damp and protected from the rays of the sun; otherwise the surface will, in setting too rapidly, be interlaced with hairlike cracks which, filling with water in winter and freezing, will cause the surface to scale off. The same scaling sometimes results from laying concrete in frosty weather.

Arch culverts of masonry or concrete sometimes fail from settlement caused by an insecure foundation. The foundation should always be of at least sufficient depth to be free from any danger of undermining by the action of the water, and of sufficient further depth to be safe from settlement.

FORM OF SPECIFICATION FOR CONCRETE ABUTMENTS.

(1) The abutments shall be built in accordance with the dimensions indicated upon the plans and drawings hereunto attached and forming part of these specifications.

(2) Concrete referred to in this specification shall be known as "fine concrete" and "rubble concrete." Unless rubble concrete is definitely specified, fine concrete shall be used.

(3) The abutments are to be erected within a substantial and well constructed framework of well fitted lumber, closely boarded up against the work as it proceeds. Care shall be taken to make a smooth regular surface so that moisture will not find lodgment. The concrete shall be perfectly rammed into place so that all surfaces shall be smooth, without cavities, when the casing is removed. The framework shall not be removed in less than fourteen days from the completion of the work.

(4) Fine concrete shall be composed of one part, by measure, of



A mongrel culvert, Lansing township, Ingham county. Cobblestone at bottom, concrete arch at top. Water washes out earth under cobbles, and down goes the culvert.

Portland cement, two parts, by measure, of sand, and four parts, by measure, of broken stone. The concrete shall be mixed in a watertight box or platform placed close to the work, by first spreading evenly a layer of sand; upon this shall be evenly spread the proportionate quantity of cement, and the two thoroughly mixed in a dry state. To this, water shall be added and the whole thoroughly mixed and brought to the consistency of thick milk gravy. The proportionate amount of stone shall then be spread evenly over the mortar and thoroughly intermixed therewith. The concrete when mixed as described, shall be immediately put in place and thoroughly pounded and rammed until it is perfectly and uniformly solid, moisture appearing on the surface.

(5) Within the body of the abutments, but not nearer than six inches to the surface in any direction, large stones may be placed by hand in layers. These stones shall be in "rack and pinion" order, and not less than two inches apart. Concrete shall be carefully inserted between the stones thus placed and thoroughly packed and rammed so as to fill all voids. Concrete shall cover each layer of stones to a thickness of half the depth of the stones, when another layer of stones may be placed. A facing of concrete is at all times to be kept at least six inches higher than the rubble concrete; and shall be united with the rubble concrete so as to form a continuous and solid mass. This outer rim of concrete shall precede the placing of the rubble work within, and shall be placed around the interior of the casing to a height of nine inches and a thickness of six inches. It is to be thoroughly pounded so that no cavities shall remain when the outside casing is removed. In no instance is the rubble concrete to extend higher than one foot below the top of the abutment, which top of the abutment shall be finished with fine concrete.

(6) All cement employed in the work must be of one of the favorably known brands of Portland cement, approved by the superintendent in charge of the work. It shall be delivered in barrels or equally tight receptacles, and after delivery must be protected from the weather by storing in a tight building or by suitable covering. The packages shall not be laid directly on the ground but shall be placed on boards raised a few inches from it.

(7) The stone used shall be trap rock, granite, quartzite, fine-grained limestone or other equally strong and durable stone, care being taken to exclude soft limestone, friable sandstone, and stone affected by the atmosphere. It shall be broken into varying sizes, the largest to pass every way, through a two inch ring. The sand used shall be clean, sharp, silicious, and of varying sized grains. The water used shall be clean and care shall be taken not to use an excessive amount, the concrete when mixed and ready for the work to have the consistency of a thick milk gravy.

(8) When gravel is used in making "fine" concrete, it shall be clean, free from clay, loam or vegetable matter, nor shall it contain stones, any diameter of which exceeds two inches. It shall first be thoroughly mixed in a dry state, with Portland cement, in the proportion of four parts by measure of pebbles from one-thirty-second of an inch to two inches in size, two of sand and one of cement. To this

water shall be added and the whole again thoroughly intermixed, the consistency, and manner of placing in the work to be in accordance with all portions of this specification applicable thereto.

When the gravel contains an excessive amount of sand, loam or other objectionable material, it shall be screened or washed clean.

(9) While the work is in progress, it shall be so arranged that a steady supply of mixed concrete shall pass from the mixing box to the point where it is to be placed. At any time when the work is interrupted before its completion, or at the end of the day a wet covering shall be placed over the last layer of concrete. Before the work of depositing the concrete is resumed, this surface shall be thoroughly flushed with water to remove any foreign material which may have gathered thereon. No concrete shall be laid in wet or freezing weather unless hot water is used, and in extremely cold weather the water should be salted.

CONCRETE TILE.

Excellent culvert pipe of concrete can be manufactured cheaply in any gravel pit under the immediate direction of the township highway commissioner. The pipes are from two to four inches in thickness, according to diameter which may safely and conveniently reach three feet in lengths of two and one-half feet.

The implements required are of the simplest kind. The most important are two steel spring cylinders, one to set inside the other, leaving a space between the two equal to the thickness of the finished concrete pipe. By "spring-cylinder," it may be explained, is meant such a cylinder as would be formed by rolling a steel plate into a tube without sealing the joint. With the smaller of these cylinders the edges overlap or coil slightly, but are so manufactured that the edges may be forced back and set into a perfect cylinder. With the larger, the edges do not quite meet, but may be forced together and fastened. Accompanying these molds are bottom and top rings, which shape the bell and spigot ends of the pipe.

The two cylinders, with joints flush, are set on end, the one centrally inside the other, and on the bottom "ring," which in turn rests on a firm board bottom. About centrally between these cylinders is placed a reinforcement of woven fence wire or similar reinforcing and the concrete, made of first-class cement, sharp sand and good clean gravel, in the proportion of one part of cement to one of sand and two of gravel, is then tamped firmly but lightly into the space or mold between the two cylinders. If there are sufficient fine pebbles in the gravel to well fill the voids in the larger pebbles, no sand will be needed. The reinforcing will prevent the tile from caving in even if it should become cracked at some future time.

The tamping-iron used to press the concrete into place is so shaped as to fit closely to the cylinders.

The concrete is allowed to stand in the mold for a short time, when the cylinders are removed; the outer, larger cylinder by removing the clamps and allowing the edges to spring apart; the inner cylinder, by



The new culvert in Lansing township, Ingham county, that will not go down, but will stand a thousand years. Cost \$165, and contains 65 yards of concrete, Height 6 feet, span 10 feet, width 28 feet.

removing the fastenings, so as to allow the edges to again over-lap, returning to the shape of a coil. The outer cylinder having thus been made larger and the inner one smaller, they can readily be taken away, and the concrete pipe is then left until thoroughly hardened. For the larger sizes of culvert pipe the two halves of the outer cylinder are usually hinged and can be more carefully removed than when allowed to "spring" from the concrete.

The making of good concrete is not a difficult matter, but it is sometimes hard to find men who will follow directions. Dirty sand or gravel, too much water, careless and insufficient mixing, neglect to see that the materials are used in the right proportions, are the defects most commonly found.

To meet with success in the use of tile culverts, they must be put in place properly. They should be laid with a good fall on a regular grade to a free outlet, in such a way that water will not stand in them.

The tile should be laid with the spigot end down grade, and the joints made tight with cement mortar. If the joints are open, water will work its way along the outside of the culvert, and finally make a considerable channel, which will allow the culvert to get out of line and finally result in a "cave in." To prevent the water from finding its way along the outside of the pipe it is advisable to protect the ends with concrete flange. Care should be taken to excavate a concave bed for the pipe, with depressions for the bell of the pipe to rest in, thus securing an even bearing, without which a heavy load passing over, before the culvert has properly settled into place, may burst the tile. Tile cannot be used in very shallow culverts, but must have a sufficient depth of earth over them to protect them from the direct pressure of heavy loads. The depth of covering necessary increases with the size of the pipe. At least a foot of earth over the top is advisable in every case, but for culverts of two feet in diameter or over this should be increased to at least eighteen inches.

The earth should be well packed and rammed around the tile to secure a firm bearing, and light soils should not be used immediately over or around the culvert. A heavy clay, a firm gravel, or a compact sand will answer, but vegetable mold, water sand, and light loams are subject to wash-outs.

At the outlet the culvert should be set nearly flush with the surface of the ground. If set higher than the surface the fall of water will wash out a depression, and in time will undermine the end of the culvert. A too rapid grade will have the same effect, and it is well to cobble-pave an outlet where this undermining action is likely to occur.

Culverts in many townships, are very numerous, and necessarily so. Water should be disposed of in small quantities, along natural water-courses, otherwise if gathered in large bodies along the road side, it gathers force and headway, resulting in extensive wash-outs, and is in every way more costly to handle. Water should be taken away from the roads as quickly as possible, for it is excess water that is the great destroyer of roads.

Culverts in addition to being a matter of considerable expense to townships, are too often in a bad state of repair, sometimes dangerous,

and, when not kept covered to a level with the roadway, an annoyance and interruption to traffic. Good road-making is largely a matter of good drainage, and culverts are a detail of drainage upon which road builders and road menders should bestow a great deal of attention, with a view to greater permanency, increased efficiency and reduction of cost.

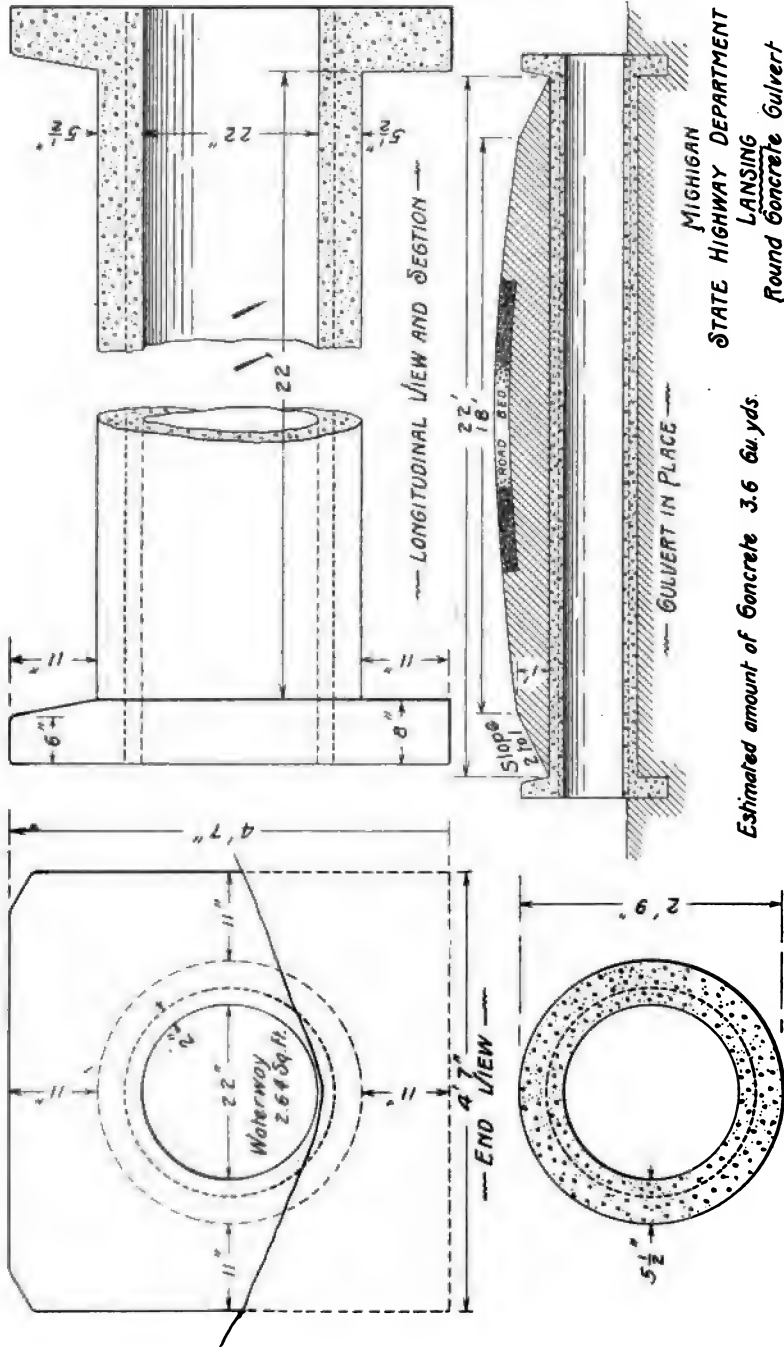
ROUND CULVERTS.

Table computed for culverts having a flange at each end, and with a height equal to one-half the diameter of the waterway, but not less than six inches, and with a clear space of twenty-two feet between flanges for embankment and roadway.

Diam. of culvert.	Area of water- way. Sq. feet.	Thick- ness of tube.	Flange.	Thick- ness of flange.	Width to dig ditch.	Cubic feet of concrete.	Cubic yds. of concrete.	Pounds of cement.	Cost.
8"	0.35	4"	2' 4" x 2' 4"	6"	1' 4"	28.19	1.04	435	\$5 20
11"	0.66	4"	2' 7" x 2' 7"	6"	1' 7"	34.82	1.29	539	6 45
13"	0.92	5"	3' 0" x 3' 0"	7"	1' 11"	52.53	1.95	815	9 75
15"	1.23	5"	3' 4" x 3' 4"	7"	2' 1"	59.52	2.21	924	11 05
19"	1.97	5½"	4' 1" x 4' 1"	8"	2' 6"	84.35	3.12	1304	15 60
22"	2.64	5½"	4' 7" x 4' 7"	8"	2' 9"	97.10	3.60	1505	18 00
27"	3.98	6"	5' 6" x 5' 6"	8"	3' 3"	130.10	4.82	2015	24 10
3'	7.08	6½"	7' 1" x 7' 1"	8"	4' 1"	189.40	7.01	2930	35 05
4'	12.57	7"	9' 2" x 9' 2"	8"	5' 2"	282.10	10.46	4372	52 30

Estimated cost of concrete \$5.00 per cubic yard. A cubic foot of cement weighs 108½ lbs. for one to seven mixture. There will therefore be 3.85 cubic feet of cement weighing 418 lbs. in every cubic yard of concrete. A 1-2-4 concrete is rich enough in Portland cement for this class of work. But be sure that the specifications are followed: one part good Portland cement, two parts clean, sharp sand, four parts pebbles from one thirty-second of an inch to one inch in size. If your gravel is full of sand, that is if all the voids in the pebbles are filled with sand, then one part cement and four parts gravel is a 1-2-4, or one in seven concrete. Concrete should be shoveled over three times while dry and three times after being wet. When ready to place it should be about the consistency of good milk gravy.

Add to the costs given above, the cost of reinforcement, and you have the cost of your square box culvert. "A stitch in time saves nine"—reinforcement is the stitch. Be sure to put it in.



MICHIGAN
STATE HIGHWAY DEPARTMENT
LANSING
Round Concrete Culvert
HORATIO S. EARLE,
Commissioner.

Estimated amount of Concrete 3.6 Cu. yds.

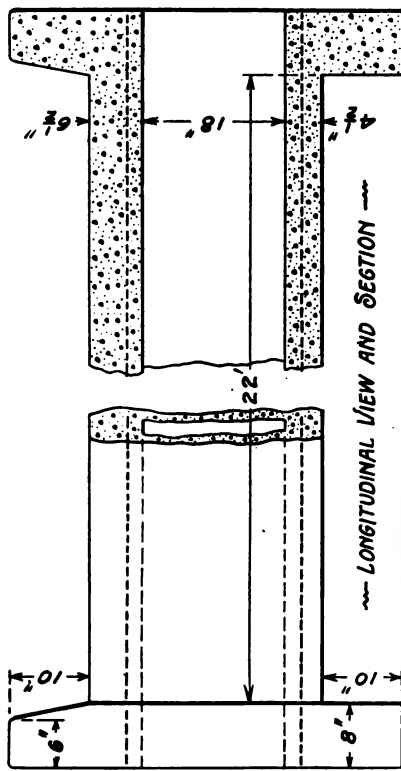
SQUARE BOX CULVERT.

Table computed for culverts having a flange at each end, and with a height equal to one half the greatest dimensions of waterway, but not less than six inches, and with a clear space of twenty-two feet between flanges for embankment and roadway.

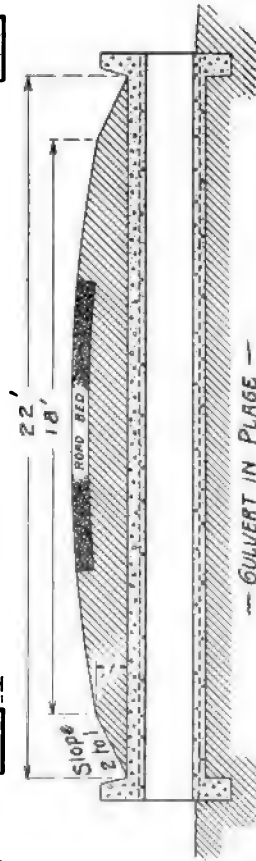
Size of culvert.	Area of waterway. Sq. feet.	Thickness of bottom.	Thickness of sides.	Thickness of top.	Outside dimensions of flange.	Thickness of flange.	Width to dig ditch.	Cubic feet of concrete.	Cubic yards of concrete.	Pounds of cement.	Cost.
6" x 8"	0.33	3"	4"	4½"	2' 1½" x 2' 4"	6"	1' 4"	30.22	1.12	468	\$5.60
8" x 10"	0.56	3"	4"	5"	2' 4" x 2' 6"	6"	1' 6"	37.17	1.38	577	6.90
10" x 12"	0.83	3"	5"	6"	2' 7" x 2' 10"	7"	1' 10"	53.08	1.97	823	9.85
12" x 14"	1.17	4"	5"	6"	3' 0" x 3' 2"	7"	2' 0"	64.72	2.40	1003	12.00
16" x 18"	2.00	4½"	5½"	6½"	3' 9" x 3' 11"	8"	2' 5"	92.50	3.43	1434	17.15
18" x 20"	2.50	4½"	5½"	6½"	4' 1" x 4' 3"	8"	2' 7"	102.23	3.78	1580	18.90
22" x 24"	3.67	5"	6"	7"	4' 10" x 5' 0"	8"	3' 0"	134.39	4.98	2082	24.90
2' 6" x 3'	7.50	5½"	6½"	7½"	6' 7" x 7' 1"	8"	4' 1"	209.20	7.75	3240	38.75
3' 6" x 4'	14.00	6"	7"	8"	8' 8" x 9' 2"	8"	5' 2"	309.60	11.47	4794	57.35

Estimated cost of concrete, \$5.00 per cubic yard. A cubic foot of cement weighs 108½ lbs., for one to seven mixture. There will therefore be 3.85 cubic feet of cement, weighing 418 lbs. in every cubic yard of concrete. A 1-2-4 concrete is rich enough in cement for this class of work. But be sure that the specifications are followed: one part good Portland cement, two parts clean sharp sand, four parts pebbles, from one thirty-second of an inch to one inch in size. If your gravel is full of sand, that is, if all the voids in the pebbles are filled with sand, then one part cement and four parts gravel is a 1-2-4, or one in seven concrete. Concrete should be shovelled over three times while dry and three times after being wet. When ready to place it should be about the consistency of good thick milk gravy.

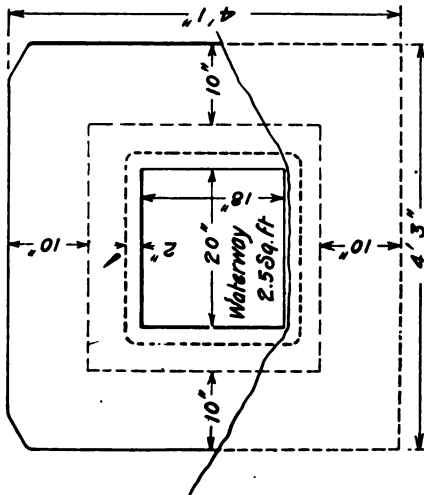
Add to the costs given above, the cost of reinforcement, and you have the cost of your square box culvert. "A stitch in time saves nine"—reinforcement is the stitch. Be sure to put it in.



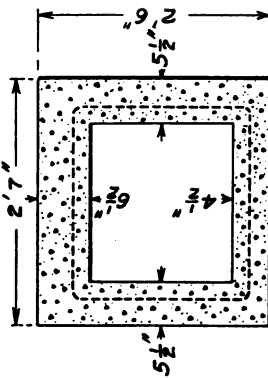
LONGITUDINAL VIEW AND SECTION



GULVERT IN PLACE



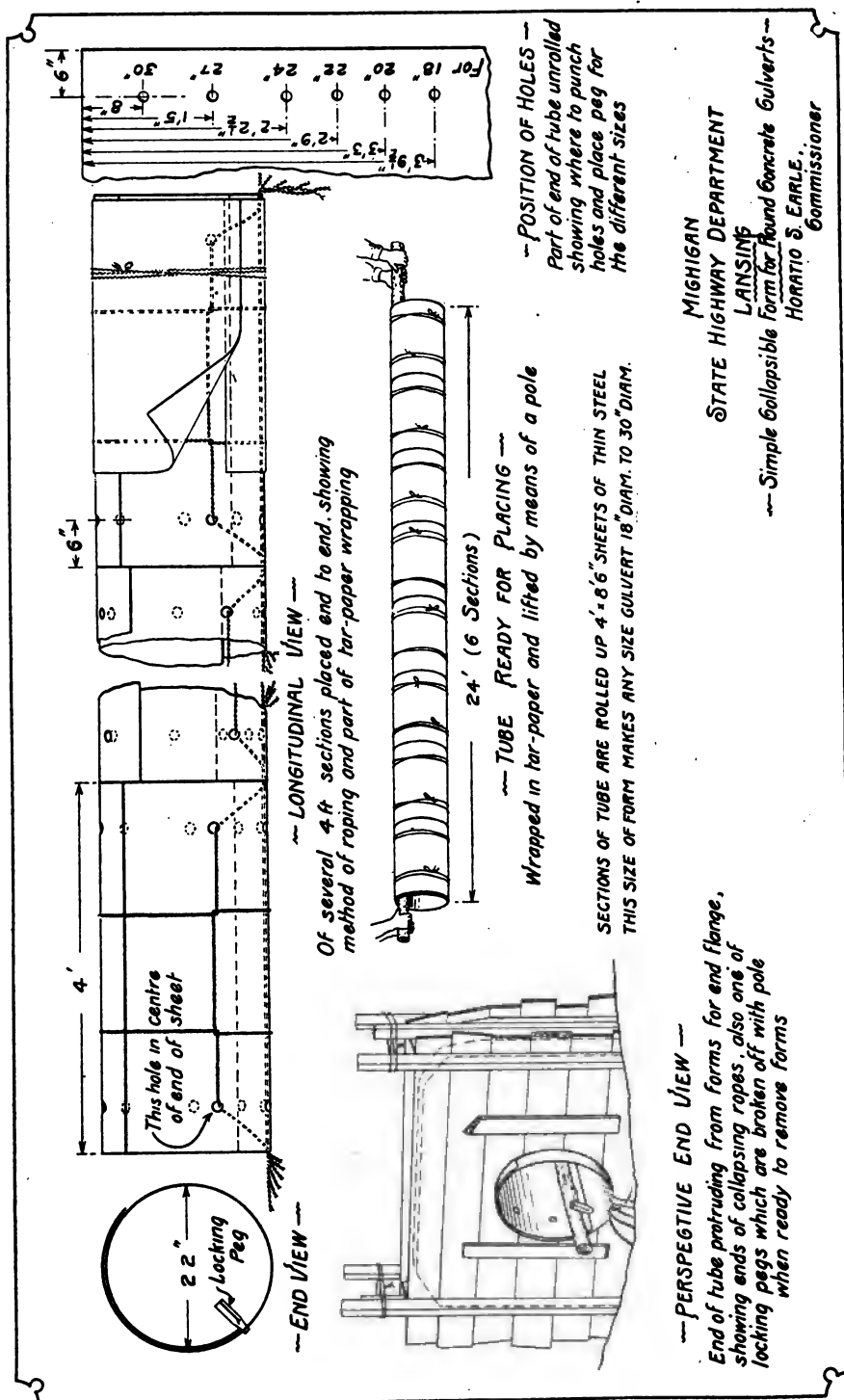
END VIEW

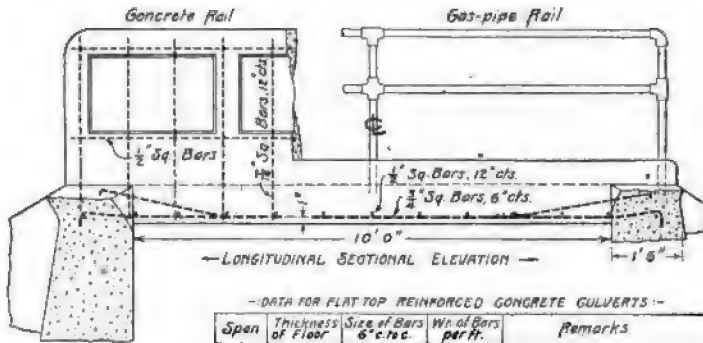


GROSS SECTION OF TUBE

MICHIGAN
STATE HIGHWAY DEPARTMENT
LANSING
Square Concrete Culvert
HORATIO S. EARLE,
Commissioner.

Estimated amount of Concrete 3.8 Cu. yds.





— DATA FOR FLAT TOP REINFORCED CONCRETE CULVERTS: —

Span	Thickness of Floor	Size of Bars	Wt. of Bars per ft.	Remarks
2 ft.	4 1/2 in	7/16" Sq.	0.65 lbs	Bars: Sq. twisted or other equivalent mechanical bond bars. Heavy floor bars
3 "	4 1/2 "	7/16 "	0.65 "	1" above bottom (to be strictly observed),
4 "	5 "	1/2 "	0.85 "	alternate bars raised at ends
5 "	6 "	1/2 "	1.33 "	Top of floor covered with 1" coat of
6 "	7 "	5/8 "	1.33 "	1:2 cement mortar. Side walls 1' 6"
8 "	8 1/2 "	3/4 "	1.91 "	at top for heights of 7 ft. or less,
10 "	10 1/2 "	3/4 "	1.91 "	increasing downward 2" per ft.

TABLE OF QUANTITIES FOR CULVERT OF 10 FT. SPAN:—

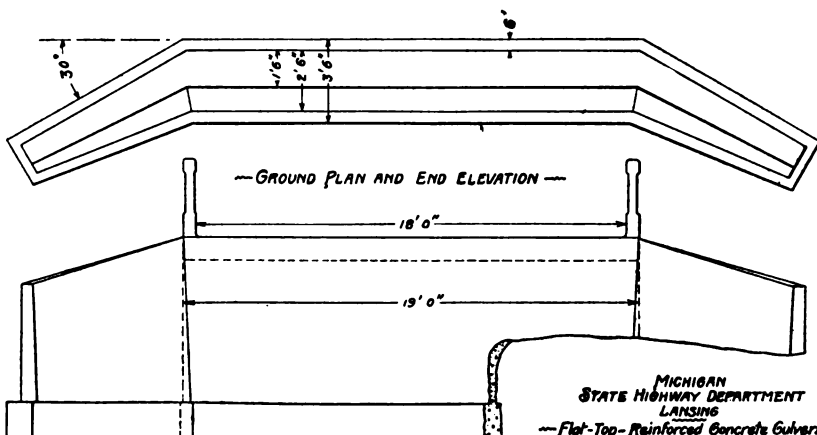
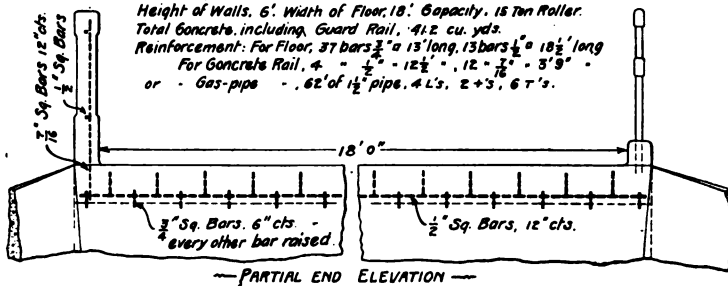
Height of Walls, 6'. Width of Floor, 18'. Capacity, 15 Ton Roller.

Total Concrete, including Guard Rail, 41.2 cu. yds.

Reinforcement: For Floor, 37 bars 7/16" x 13' long, 13 bars 1/2" x 19 1/2' long

For Concrete Rail, 4 " 1/2" x 12 1/2" x 12' x 1/16" - 3' 9"

or - Gas-pipe - 62' of 1 1/2" pipe, 4 L's, 2 + S, 6 T's.



MICHIGAN
STATE HIGHWAY DEPARTMENT
LANSING
— Flat-Top-Reinforced Concrete Culverts —
HORATIO S. EARLE,
Commissioner

FLAT TOP REINFORCED CONCRETE CULVERTS.

Generally, a flat top culvert is more practical and is cheaper to build than an arched culvert.

Both outside and inside walls should be battened back so that neither frozen ground or ice will lift the abutments or wing walls.

A concrete railing adds beauty and strength to the structure, and panels beautify without weakening it, and save concrete besides.

Be sure to put the footings deep enough. Many times it is wise to pave the bottom, especially where there is quick sand, running an apron down at both ends of the culvert and reinforcing this paving into the footings of abutment so it cannot crack.

This culvert can be made with I-beams instead of reinforcing rods if desired; the number and size will be found in the I-beam table given elsewhere in this report.

CULVERT FORMS.

There are several good culvert forms for sale but it is possible to improvise some at a very small expense which will answer the purpose.

The sheet steel form shown herewith is made from four foot lengths of thin sheet steel rolled in the form of a tube, and placed end to end and wrapped in tar paper to form a continuous tube across the grade, and through the head wall forms. Each length of steel should have holes punched near the ends, as shown in illustration. Roll it up, put wooden pins in the holes to keep the tube from collapsing. Tie a single knot around each end of the tube and pass the ends of the rope down through the holes in the end of the tube. The rope must be long enough to reach to the sides of the road. Follow this plan with each section until there is enough to form a long tube across the grade and through the head wall forms, then with separate strings tie tar paper around the entire tube. Put a pole through the tube and after the trench has been dugged and the bottom of it paved with concrete, lower the tube into the trench by taking hold of either end of the pole. Put in the head walls or flange forms and fill the trench with concrete mixed to the consistency of thick milk gravy. It is well to lay some reinforcing steel in lengthwise, and put some crosswise on the top.

When the concrete has set, break off the pins inside the tube with the pole. A man at each end of the culvert will then pull on the ends of the rope attached to the first section. By having one man pull harder than the other the section can be easily pulled out. Do this with each section until all the sheet steel forms are removed, leaving the tar paper inside the culvert.

Where sheet steel cannot be procured, get some common woven wire fencing. Roll it up to size of inside of culvert wanted, making it lap about three times around. Tie the laps together with bow knots. Make enough sections to go across the road, tie a pole to the inside lap, also tie the ends of the rope forming the bow knots to the pole. Tie tar paper around the whole tube and proceed as with sheet steel form. When the concrete has set, begin rolling the pole which will untie the bow knots and will roll up the fencing into a smaller tube. When small enough, pull it out.

Concrete should be mixed in the proportion of 1-2-4,—one part cement, two parts sand, four parts pebbles or crushed stone, and should be shoveled over three times dry and three times wet.

CULVERTS.

BY PROF. W. O. HOTCHKISS, STATE ENGINEER, MADISON, WIS.

For many years we have been swearing at our poor roads—each one of us wondering why somebody else didn't get busy and improve them. We have drawn unfavorable comparisons with the roads of Europe and then excused ourselves by saying that we are a new country, and other excuses are called up when that one doesn't seem to go.

The whole truth of the matter is that we are just beginning to wake up and find out that it isn't the other fellow who has been to blame for our roads, but ourselves. We are beginning to see that unless each one of us takes a personal interest and does something that nothing much is likely to be done. We have gone on trying to work with the highway system of the Middle Ages handed down through our New England ancestors a century after other progressive countries have discarded it. We have been trying to fit square pegs into round holes without success and only in recent years have we begun to get sense enough to know that we must whittle the peg down to fit the hole.

It is really surprising that until the last few years even ordinarily intelligent people have not known even the most simple principles of road building.

It is about the first and most important of these principles that I want to talk today. Your Highway Commissioner, Horatio S. Earle, has expressed it very tersely. "Get the water off, out and away." I want to talk about *culverts*.

Culverts are made of many materials. There are wood, tile, concrete, steel and cast iron. Each material has its proper place in culvert making; even wood can properly be used for culverts. It should be used in those back-woods towns where they are forty miles from a railroad and can saw their own lumber at an expense of not over \$10 a thousand board feet. In any other place a wooden culvert is just a case of that square peg in the round hole.

A proper aim in all expenditure of money is to get something permanent. When we buy a pair of shoes we are willing to pay a little more for a pair that will wear well. When we build a barn we put a

solid foundation under it at an increased expense, if we can afford it, because it will last longer than a barn built on the ground, and we feel we are getting our money's worth.

The public are better able to afford to buy lasting things than individuals are for the simple reason that all of us are richer than any one of us. In building culverts we want to get them in so they will stay; we want permanent improvements.

The only materials that we use for culverts that will not rust or rot are stone, tile and concrete. If we put wood in it is only a question of a very few years with the poor lumber we get now days before the culvert will have to be replaced. If we use metal culverts it is just the same as with wood, only the time it takes them to rust out is longer than it takes the wooden ones to go. But there are places where metal culverts should perhaps be used in preference to any others.

Tile culverts should not be used when the water will stand in them for they will freeze or crack, nor close to the road surface where wheels will cut them. Iron culverts should be used only when it is necessary to put in a small culvert close to the road surface and for places where water will stand.

The best material to build culverts of is concrete. Many towns in Michigan and Wisconsin are blessed with abundant gravel that is often times right at the site waiting to be used. It is surprisingly simple and easy and cheap to build small concrete culverts when you once get used to it. It isn't a very great undertaking to make a square box the size of the waterway you want, dig a trench, put in six inches of concrete, lay the box on the bottom you have made and shovel your concrete around and over it to the proper thickness. The difficulty is to get started to building them.

In order to present arguments to our people over in Wisconsin to show them why they should build more concrete culverts, we got to studying the cost of the various forms of culverts and figuring how long they would last. We arranged the results of this study in the table given.

<i>Kind</i>	<i>Shape</i>	<i>Size</i>	<i>Cost</i>	<i>Cost for 100 years</i>
<i>Wooden box</i>	□	<i>15" sq.</i>	<i>\$16.80</i>	<i>\$252.00</i>
<i>Concrete box</i>	□	<i>15" sq.</i>	<i>40.00</i>	<i>40.00</i>
<i>Cast iron</i>	⌒	<i>16" sq.</i>	<i>57.90</i>	<i>97.80</i>
<i>Cast iron</i>	⊖	<i>18" sq.</i>	<i>65.25</i>	<i>112.50</i>
<i>Cast iron</i>	○	<i>18" sq.</i>	<i>92.40</i>	<i>166.80</i>
<i>Vitrified tile</i>	○	<i>18" sq.</i>	<i>42.00</i>	<i>42.00</i>
<i>Corrugated steel</i>	○	<i>18" sq.</i>	<i>50.40</i>	<i>196.00</i>
<i>Circular concrete</i>	○	<i>18" sq.</i>	<i>35.00</i>	<i>35.00</i>

This table is worth careful study, but I will only take the time to call your attention to the last column—"Cost to keep up one hundred years." In this column it is assumed that a wooden culvert will last seven years, a cast iron pipe fifty, a corrugated steel pipe twenty,



Building a Kalkaska county turnpike above the frost line of the water.

tile one hundred and concrete one hundred. These allowances are generous to everything but the tile and concrete. If concrete is well laid it is just as good for five hundred years as for one hundred, but even with these allowances concrete is the cheapest material by far when length of life is considered.

ROAD DRAINAGE.

No road, no matter of what material, built in our climate, can be good all the year around, unless the water is off from the surface, out from the sub-grade, and away through the ditches to the natural water courses.

The road should have a crown of about one inch to the foot from the center to the side ditches. This may seem to be too much, but each year the center lowers a little by wear and wash, and a portion of this substance so worn off lodges at the sides, so that the steepness grows less each year; then the humus helps to raise the sides to some extent. A road must be kept clear of ruts; it must be smooth. This can best be accomplished by the frequent use of a road drag.

It isn't enough to get the water off the road, and all the drags in Christendom cannot make a good road out of a road that is chock full of water, even though it be smooth on top so that the surface water can run off. Water must be out. This is done by open ditches or some one of the many kinds of under draining. Open ditches are the cheapest and for that reason must prevail, it is only the high valued districts that can afford the expense of tile drains of sufficient size to take care of both surface and subgrade water.

The idea prevails that if the ditches are deep and the road grade high, even though the ditches are chock full of water, that there is no water in the subgrade, but anyone who thinks for a moment knows that by capillary attraction if the water stands in the ditches the road is just as full of water as the ground is capable of holding, and being full of water it is soft and the wheels quickly rut the surface, and then water begins to seep in from the top. So it is absolutely necessary to have the water away, that is, out of the ditches. If I could have but one grade established, that of the road or the ditch, I would by all means choose that the ditches should have a true grade, and that as often as possible outlets should be made for carrying the water entirely away from the road.

For springy ground it may sometimes be necessary to lay tile under the road, lengthwise of the road, in the center, but this should never be done unless really necessary, for it is detrimental to any road to dig it up. Springy spots should be treated by putting in tile from the side ditch, or by making a blind ditch. Always put a layer of hay or straw over the top of a blind ditch so the dirt will not fall down in and fill up the voids in the stone, because if it does the water will not be able to run out.

We are often asked if oil put upon the top of the road will not make it water proof and so a good road. Nothing can be done to the

top of the road to make it proof against water coming into it from the ditches if they have standing water in them, and the kind of oil we have in this section of the United States contains only a small amount of asphalt base, not to exceed sixteen per cent. The California and Texas oils run from forty to fifty-eight per cent and have a body about like tar. Our oil is so thin that it seeps into the road and is of no lasting benefit.

If a locality can afford it, a road coated with common tar, will produce an excellent surface. An economical practical plan can be found elsewhere in this report under the heading "Tar-Veneer Macadam Roads."

If you have any difficult draining to do, our advice is—get your local surveyor. There is nothing equal to the instruments to find out where the water should go and the best way to get it there.

DRAINAGE AND SUB-GRADE.

What is a road?

It is a part of a transporting machine.

To illustrate: One machine is composed of a horse, a wagon and a road. If one part of this machine is poor, the whole machine is poor, and costly to run. It makes no difference which part—if the horse is poor and the wagon and road are good, only a small load can be drawn and slowly at that. So, too, if the wagon is poor, and the horse and road are good, the same effect prevails and the result is the same, where the road is poor and the horse and wagon are good. The machine must have all parts good, or else it is a poor machine.

It is just the same where the power is an engine, and a part of the wagon; there are still three parts to the machine—the power, the wagon and the road. No matter how good are two parts, if the other one is poor the whole machine is poor.

For centuries we have been breeding up the horse to get a perfect animal, and while the breeders have been doing this, the wagon-makers have been perfecting the wagon; but all to little effect as to velocity and hauling ability over the roads, for the road masters have been breeding down the roads to offset the breeding up of the horses and the wagons.

Who would think of using a belt incapable of carrying the power to a machine, in order to properly run the machine? Or, who would think of having a poor machine to do the work with plenty of power and a good belt? Then, let us get sense and make the last part of the road machine, the road itself, as good as the horse and wagon, and then we shall exhibit true horse sense.

Drainage is a subject big enough to warrant a convention of two days doing nothing else but studying it, and then, in all likelihood, the road engineer would find the first problem that he met with was one part of the subject not considered at the convention. Surplus water must be off, out and away, but not all moisture, for your road is less dusty and more durable if it contains just enough moisture. This brings us up to the perfect road, which does not exist, and will not.

Some soils are over-drained. Generally speaking, a sandy soil is; then, no tile are needed, and no ditches are needed, and should not be made, but just large enough gutters to take the surface water off the road, and the shoulders or berms of a road in such a soil should be grassed over and the gutters, too. And, if they are, a moisture will rise from your water-table below, in dry times, so as to cause your road to be less dusty, and so more durable.

But, in our eastern and middle country we are bothered more with excess of water than with a lack of it.

A mayor of a small city, a physician by profession, came to me for advice as to what to pave their streets with, and my advice was,—for the main business street, tar macadam; for residence streets, common macadam. "But," said he, "didn't that tar macadam heave, in Port Huron?" I said to him, "Mr. Mayor, I am surprised that you, a doctor, should bring that up as against the pavement. I suppose," said I, "that if I were bloated ten or twelve feet around me and sent for you, you would say I had some kind of a skin disease, and you would prescribe some kind of skin salve—wouldn't you? No, you wouldn't, you would say that I had a surplus of wind or water, and that it would have to be taken out or I would heave so that I would bust. And, I say to you that if that street had been paved with gold it would have heaved, for the engineer had not provided a drainage that took the surplus of water out from under that pavement within frost-line distance."

What proportion of town road commissioners in the United States know at what depth to place a tile or the bottom of a ditch at the side of a turnpike road, to drain the center of that road below the frost-line level?

Not one per cent. Then, what is the remedy?—Teach drainage in your common schools, for this changing of commissioners every year brings about every grown-up country boy into the office of township highway commissioner sometime during his life; and this early teaching would have good effect on the roads.

But, let me hand out to you a simple, general rule, and I wish it might be so published that every road master in the country might read it.

To drain the sub-grade of a road where there are no springs, place the bottom of your ditch, or your tile, at the sides of a 24-foot roadway as many feet below the center of the road as the frost goes down, and six inches more, and your road cellar will be dry enough so that your road will never heave provided you put on a tight roof so that no water can percolate down into it from the top.

If you are only to ditch or tile one side of your road, go six inches deeper.

One more word: Tile under a road is generally a mistake, for it takes a foot of ditch digging, and a foot of tile for each foot of road; while a tile across the road at the proper depth once in one hundred feet is one-quarter as much tile and ditch, and if opportunity is given for discharge at one or both ends, will do the road just as much good.

(Abstract from address by Commissioner H. S. Earle at the Good Roads Convention at Buffalo, July 7, 1908.)

BETTER DRAINAGE OF HIGHWAYS.

An Act to provide for the better drainage of highways in certain cases.

(P. A. 1903, Act 56.)

The People of the State of Michigan enact:

SECTION 1. Whenever it is necessary or more convenient for the proper drainage of any highway in this State that the surplus water be taken onto or across the land adjacent thereto, the highway commissioner of the township in which said highway is situated, may secure the right of way and may open such drain or outlet for the water, and for these purposes may use any highway moneys of the township not otherwise appropriated, and such sums as may be voted for that use by the electors of the township, and he may also employ for that purpose the highway labor of the district in which such drain may be situated. The highway commissioner shall secure the right of way for any such drain by gift or purchase from the owners of the land to be crossed by such drain; but in case of purchase the purchase price must be approved by the township board before any money be paid thereon. Such right of way shall be acquired by deed duly executed by the owner or owners of the lands sought to be crossed by the said drain, and shall be taken in the name of the township wherein the same is located, and filed in the office of the register of deeds of the county before any highway money or labor shall be expended in opening such drain outside the highway limits. This act shall not apply to Alpena county.

SEC. 2. The highway commissioner shall report to the electors of the township at their annual meeting the amount of money expended by him during the year for such highway drainage, specifying the amount expended on each drain. He shall also recommend the raising of such sums as he may deem necessary for opening drains from the highway during the coming year, specifying each proposed drain and the probable amount needed for securing the right of way and opening the same. The money voted for this purpose by the electors of the township shall constitute a special highway drain fund, and shall be used for no other purpose. In case any money be left in the fund, after opening the drain for which it was raised, it may be used in opening any other highway drain in the township, or in cleaning out, when necessary, those already opened.

SEC. 3. On the completion by the highway commissioner of any drain constructed under the provisions of this act, it shall be the duty of said highway commissioner to file in the office of the county drain commissioner a detailed report of the construction of such drain, giving the date of construction, the termini and general course thereof,

together with a copy of the deed by which the right of way therefor was secured. Nothing in the provisions of the preceding sections shall be construed as giving to highway commissioners power to lay out and construct drains having any other purpose than the drainage of highways.

SEC. 4. In case the highway commissioner cannot secure the right of way across adjacent lands for the construction of any drain by agreement with the owner or owners of the land through which it will pass, he may make under his name of office an application to the drain commissioner of the county in which the proposed drain is situated to lay out and establish the said drain. Such application shall conform to the law regulating applications for the construction of drains, and shall require no other signature than his own as highway commissioner. Such application shall have the same force and effect and be subject in other respects to the same laws and regulations that govern other applications for the establishment of drains, and shall confer jurisdiction and authority on the county drain commissioner to lay out and establish such drain under and by virtue and in pursuance of the law governing the location and establishment of other drains.

OPINION OF ATTORNEY GENERAL RELATIVE TO DRAINAGE AND DRIVEWAYS.

"Has the county drain commissioner, acting under request of a township highway commissioner according to Act No. 56 of the Public Acts of 1903, the right to assess any benefits to the abutting property, provided the laying of the drain actually benefit such property, or must the township bear the whole expense?"

Section 4 of Act No. 56 of the Public Acts of 1903, after authorizing the highway commissioner to make application to the county drain commissioner for the construction of a drain, provides:

"Such application shall have the same force and effect and be subject in every respect to the same laws and regulations that govern other applications for the establishment of drains, and shall confer jurisdiction and authority on the county drain commissioner to lay out and establish such drain under and by virtue and in pursuance of the law governing the location and establishment of other drains."

Section 1 of chapter 5 of Act 254 of the Public Acts of 1897, as amended, being the drain law, provides:

"The county drain commissioner shall apportion the per cent of the cost of construction of such drain which any township traversed or benefited thereby shall be liable to pay by reason of the benefit to the public health, convenience or welfare, or *as the means of improving any highway*, and he shall also apportion the per cent of benefits accruing to any piece or parcel of land by reason of the construction of such drain, over and above the present assessment against such township as aforesaid, which per cent of benefits shall be apportioned upon and assessed against the lands benefited according to such assessment and

benefits and which apportionment he shall announce at the time and place of letting, as provided in chapter four. Such assessment of per cent for benefits shall thereupon be subject to review and correction, and may be appealed from in the manner hereinafter provided."

Taking the last two quoted sections together, we are of the opinion that the county drain commissioner has the authority to assess benefits to such abutting property as is actually benefited by the construction of a drain.

In reply to your inquiry as to whether the highway commissioner has authority under Act No. 56 of the Public Acts of 1903 to assess benefits to abutting property in the construction of a drain under said act would say that we find no provision in said Act 56 that would in any way authorize the highway commissioner to assess benefits to abutting property, nor have we been able to find any other provision of law that would authorize the highway commissioner to assess benefits to abutting property in the construction of drains under said Act 56.

"Has the township highway commissioner the right to grade down a road or dig a ditch along the highway past a man's dooryard or barnyard, when it is necessary to do so to improve the road; and, provided he has, is he obliged to put in driveways to the house and barn at the cost of the township?"

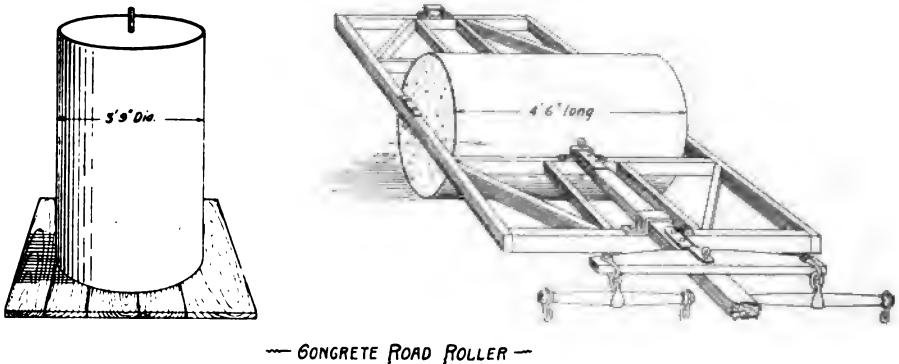
It seems to us that if it is necessary for the highway commissioner to grade down a road or dig a ditch along the highway to properly construct or improve the road, the commissioner would have authority to do so. We have not been able to find any statute which would require the commissioner in such cases to provide driveways to the house or barnyards of the property owners along the highway; and in the absence of a statute requiring the same, we do not think that the highway commissioner would be obliged or authorized to construct such driveways.

DECISION OF SUPREME COURT RELATIVE TO DRIVEWAYS.

Highway Commissioner vs. Ely, 54 Mich. 177.

"If, therefore, in this case the ditch in question was such an ordinary ditch as the good of the road should dictate; if the sole end of constructing it was to improve the road and the consequent benefit to the public; and if in carrying out this object it became either necessary or expedient to dig the ditch in front of the defendant's premises and past his gateway, the commissioner or overseer acting under his directions, had a right to do it; and if in the execution of this power, which was entirely in their discretion, they dug the ditch to such depth and width as to render it impassable for teams or vehicles going in or out of the defendant's fields, they would incur no liability to defendant. It would be the performance of a public duty and the exercise of lawful authority from which, if the defendant suffered injury, it would be *damnum absque injuria*. There is no liability for doing an act which is either directed

or authorized by a valid statute, if performed with reasonable care and skill. There is no law which requires the township authorities, in making or repairing roads, to construct proper or convenient passage ways to enable an adjoining land owner to reach the traveled part of the highway. If in filling up the low places or in cutting down the hills to improve the public roads an adjoining land owner is inconvenienced, or his land made more difficult of access, it is an inconvenience or loss which he sustains for the public benefit. He has a right of access to the public street, and if necessary for him to reach the traveled part, he has the right to bridge a ditch or construct a grade for that purpose; but in doing so he has no right to willfully obstruct such ditch or highway, his rights as a private land-owner being subordinate to the public right of constructing and keeping the highways in repair."



— CONCRETE ROAD ROLLER —

CONCRETE ROAD ROLLER.

A most excellent road roller can be made by anyone, and so cheaply that the cost will not be of any consequence.

Purchase a boiler shell four feet, six inches long, and three feet, nine inches in diameter. Set it up on end, put a shaft in the center and fill the shell with concrete.

Make a frame like the one illustrated and you will have a five ton road roller at a cost of about fifty dollars.

USE OF STEAM ENGINES ON HIGHWAYS.

An act to regulate the use of steam engines, steam wagons or other vehicles, which are in whole or in part operated by steam, on the public highways of this State, and to prohibit the blowing of steam whistles upon the public highways of this State.

(P. A. 1887, Act 145.)

The People of the State of Michigan enact:

SECTION 1. It shall be unlawful for any person, company or corporation owning or controlling any carriage, vehicle, traction or other engine propelled by steam, by themselves, their servant, agent or employe, to allow the same to stand upon any bridge or culvert in any highway for taking a supply of water, or other purpose; and it shall also be unlawful to permit or use the same to pass over, through or upon any public highway, road or street, unless such owner, owners, agent, servant or employe shall send before the same a person of mature age, at least ten rods and not more than forty rods in advance except that incorporated cities and villages such persons shall be not less than four rods and not more than ten rods in advance, to notify and warn persons traveling or using said highway, road or street with horses or other domestic animals, of the approach of such carriage, vehicle or engine. And upon the approach of any person or persons with horse or horses, or other domestic animals, from behind or in front, said owner or owners, agent, servant, or employe of such steam vehicle, carriage or engine having the same in charge, shall cause the same to be stopped, and the steam of such engine to be immediately shut off, and to render such assistance as will enable such team or teams of horses, or other domestic animals to pass in safety; and at night such persons shall carry a red light; and such persons shall carry and use plank sufficient to plank all crosswalks: Provided, That the provisions of this act shall not be construed to apply to automobiles: Provided further, That no township shall be liable for any damages sustained by the breakage of any bridge or culvert by any steam engine or steam vehicle weighing more than six tons.

Am. 1899, Act 217; 1903, Act 71.

USE OF STEAM ENGINES: Persons making use of horses by means of travel or traffic by the highways have no rights therein superior to those who make use of the ways in other permissible modes.—*Macomber v. Nichols*, 34 / 213. If one in making use of horses as a means of locomotion on the highway is injured by the act or omission of another using a steam locomotive, the question is not one of superior privilege, but whether, under all the circumstances, there is negligence imputed to some one, and if so, who should be accountable for it.—*Id.* In an action for an injury caused by a horse taking fright on a highway at an engine being propelled by steam it is error to permit the right of recovery to turn upon whether the engine was calculated to frighten horses of ordinary gentleness. The bringing of an unsightly object into the common highway is not necessarily wrong because of its tendency to frighten horses any more than the construction of a bridge over a river is a wrong because of its tendency to delay vessels.—*Id.*

LIABILITY: For liability of municipality for injuries received by person or engine by reason of defective bridge, etc.—*Stebbins v. Keene Township*, 55 / 552; *Woodbury v. Owosso*, 64 / 239.

SEC. 2. Any person or persons who, while traveling upon the public highways of this State with a steam engine, steam wagon or other vehicle which is, in whole or in part, being worked, run or operated by steam, or to which a steam whistle is attached, shall blow or sound, or cause to be blown or sounded, any steam whistle while so traveling



Grading road in Eaton township, Ionia county, using two road graders and a traction engine.

Mr. Slaybaugh, highway commissioner, says: "Last spring it was so wet we could not use our grader with horse power, so I invented a scheme for using two graders with a 16 H. P. engine, which kept the engine in the center of the road and worked fine, having a great many advantages over one grader. For dressing up the roads in spring I can get to work so much quicker and finish it with about half the expense. We can reach out twelve or thirteen feet each way from center."

upon the public highways of this State, shall be guilty of a misdemeanor.

Sec. 3. Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding twenty-five dollars, or by imprisonment in the county jail not exceeding fifteen days, or by both such fine and imprisonment, in the discretion of the court. Any person, company or corporation violating any of the provisions of this act shall also be liable for all damages sustained thereby by any person or persons traveling upon or using said highway with horses or other domestic animals, to be recovered in an action of trespass on the case.

Sec. 4. This act shall not apply to railroads.

TRACTION ENGINES.

(Abstract of address by Commissioner H. S. Earle at the Threshermen's Convention, Lansing, December 12, 1907.)

I am glad to have the privilege of speaking to you, for you are as much interested in good roads and bridges as any class of taxpayers in the state. You are also the natural and logical doctors of the road. You possess the best road instrument to cure the average disease of the common dirt road, which is the lack of sufficient crown to shed the water to the side ditches. If the water runs off quickly the road remains dry throughout the entire year.

I was taught how to scrape a road by an ex-thresherman who today is one of Michigan's best road builders. Place your engine in the center of the road and two road graders behind it, one on each side of the road, chain these graders together so that the front end of the blades will engage the furrows plowed along side and the back ends of the blades will just come to the outside edge of your road. This will throw the sods up on the outside edges of your road to form the berms or shoulders. Then the under dirt can be plowed and thrown over into the center of your road. No sods should ever be placed in the twelve foot center where the travel comes except in a very sandy soil. This kind of a grading outfit will save a township from ten to fourteen dollars a day, and I will prove it to you. You know it takes three good teams to haul a grader, these will cost at least \$3.50 a day, and to haul two graders, six teams at \$3.50 a day, amounts to \$21, and you all know the teams will stand resting at least one-fourth of the time, but this we will not take into consideration. Now, you are willing to work for \$6 to \$10 a day, and you can do twice as much grading in a day as six teams if you use this plan, and providing there are enough teams on the plows to keep enough plowing done so you can be constantly at work.

To keep the front end of your graders from drawing together you must either brace the ends of your poles apart, or else have a cross bar attached to the rear of your engine to hitch your poles to.

With Michigan's new cash road tax law the townships are in a position to hire such help as is best for the taxpayers and I want you to look for these jobs for the sakes of those who have to use the roads. Under this new law the township highway commissioner can commence grading the roads on the first Tuesday in April and at that time you

threshermen have no work for your engines to do. There are two taxes, one for road repair which must be expended on the roads directly benefitting the property taxed, and a highway improvement tax which is raised for the purpose of building new culverts and bridges and building new roads and making repairs in cases where there is not sufficient road repair money to do so.

This law will in a few years cause good enough culverts and bridges to be built so that you won't go through them with a ten ton engine, and it is necessary today to have such engines, for Michigan is a ten ton state, and our country is a ten ton nation. A few years ago when you started out you did not know where you were going. It depended largely upon what kind of a life you had lived, for you were very liable to go through a bridge, engine and all.

SPECIFICATIONS FOR TAR VENEER MACADAM ROAD.

Macadam—First Course.

After the road has been graded and rolled, a layer of crushed stone shall be spread on the prepared bed to such uniform thickness as will, when compacted by thorough rolling, be not less than three and one-half inches thick.

Stone for this course shall be of a suitable grade of crushed limestone, cobblestone or trap rock, and shall consist only of that part of the crusher product passing over the one-inch section and through the three-inch section of the crusher screen. This stone shall be placed on the road uniformly mixed, no patches of alternately large and small stone being allowed.

The road metal shall be rolled a sufficient number of times with a roller weighing not less than seven tons to thoroughly compact it. No soft or disintegrated stone will be allowed to be used.

Binder—First Course.

Binder for first course shall consist of that portion of the crusher product passing through the one inch section of the crusher screen. If limestone screenings are used the dust shall be removed. These screenings shall be spread on the layer of crushed stone to a uniform thickness of from one-half to three-fourths of an inch, and the whole thoroughly rolled. The amount of screenings used shall be somewhat less than enough to fill the voids in the coarser stones. Water may be applied in advance of the roller, after the binder is added, if ordered by the officer in charge, but should be used sparingly on clay subgrades.

The rolling must be continued until the binder is worked into the crevices of the larger stones, and the stones cease to sink or creep beneath the roller. If any depressions are formed when rolling, they shall be filled with the smaller stones of suitable grade, and not with screenings.

Macadam—Second Course.

After the first course of macadam has been finished, the second layer of stone, consisting of crushed limestone, cobblestone or trap rock, shall be added, same to be uniformly mixed, and when rolled thoroughly it shall be not less than two and a half inches thick, and shall consist only of that portion of the crusher product passing over the three-fourths inch and through the two-inch sections of the crusher screen.



Mt. Elliott road, Hamtramck township, Wayne county. Tar-veneer macadam road. Built by county road commission.

The stone shall be placed upon the road and spread and rolled in exactly the same manner as prescribed for the first course.

Binder—Second Course.

Binder for the second course shall consist of that portion of the crusher product passing through the one inch section of the crusher screen with the dust left in. If cobblestone or trap rock is used for this course the screenings should be half limestone and half hard stone thoroughly mixed. Spread these screenings to a depth of from one-half to three-fourths of an inch over the second course of stone. Sprinkle and roll a sufficient number of times to thoroughly compact it.

Tar Macadam—Third Course.

After the binder applied to the second course has been thoroughly sprinkled and rolled and has had time to completely dry, as herein-after specified, the tar top will be applied. The material with which this application is to be made shall be pure coal tar which has been heated to a temperature of from 200 to 225 deg. Fahrenheit. When the required temperature is obtained the coal tar shall be flooded on the road and broomed in with split rattan brooms. After this first coat of tar has become absorbed into the road, a second application of coal tar, heated to the same temperature as the first coat, shall be made in the same way, and broomed in so that all interstices and voids will be completely filled.

Following closely on this second application of coal tar, limestone, cobblestone or trap rock chips shall be applied. These chips shall range in dimension from one-half to three-fourths inch, longest diameter. This covering, or wearing surface, shall be applied while the second coat of tar is hot, and shall be of a uniform depth of not less than one inch. Immediately after this course has been applied uniformly over the entire travel path and on top of the second coat of coal tar, the roller shall be run over this course of stone a sufficient number of times to thoroughly imbed this stone in the last coat of coal tar, and the rolling shall be continued until the road is hard and smooth and no depressions of any kind appear in its surface.

Special Requirements.

No water gas tar will be allowed to be used. Nothing but pure coal gas tar shall be used in the work.

No application of tar will be allowed on the road, except when the road is perfectly dry.

The road shall be kept closed so as to be free from dirt and foreign matter and no travel shall be allowed on it until after the third course is completed.

No application of coal tar will be allowed except on a dry hot day, so that the road will be in a receptive condition to receive the tar.

No application of coal tar will be allowed to be placed on the road until at least twenty-four hours after any storm. Nor will any coal tar be allowed to be applied on the road until the dew has thoroughly evaporated from the road.

In other words, the road must be thoroughly dry and free from moisture, and the day must be hot, so that the road will receive the full

benefit of the sun. The road must be thoroughly cleaned, so as to be free from all loose material. After the stone and coat of tar have been applied and the road has been rolled, it shall be kept closed for twenty-four hours before allowing travel thereon.

All work shall be done in a thoroughly workmanlike manner, and all material shall be first class, and as specified.

This tar veneer course is no experiment, and wherever used has been found to be a first class dust layer, in addition to making a road absolutely water proof and preventing raveling by automobile traffic. It would be well for villages and cities to investigate this before building costly pavements on residence streets.

SPECIFICATIONS FOR TAR MACADAM PAVEMENTS.

Grading.

The roadway shall be excavated and graded in such manner that the finished surface of the sub-grade, after rolling, shall be eight inches below the grade established for the completed pavement and parallel thereto. The sub-grade shall be thoroughly rolled with a steam roller exerting a pressure of not less than three hundred and fifty pounds per linear inch of roller wheels. Soft and spongy places not affording a firm foundation, or newly made excavations for trenches or other purposes that have not been properly filled and consolidated shall be dug out and refilled with suitable earth, well rammed into place.

First Course.

This course shall consist of a layer of a suitable grade of crushed lime rock, or other approved stone, all of which must be broken so as to pass through a three inch ring, no stone being used less than one-half inch in any dimension except for binder as hereinafter provided. This stone shall be placed upon the street uniformly mixed, no patches of alternately large and small stone being allowed. After the stone has been carefully spread as above specified to a uniform depth of five inches it shall be rolled with a steam roller until firmly bedded in place. After such rolling a binding course to the depth of about one-half inch consisting of stone chips ranging in size from dust to three-fourths inch shall be applied and thoroughly broomed and rolled into the crevices of the larger stone until the first layer of stone has become thoroughly compacted and the engineer is satisfied that no further rolling is necessary.

Any depressions that may be formed by rolling this course of stone shall be filled with stone of suitable grade under the direction of the engineer until a perfect surface is produced everywhere parallel to the finished grade.

Second Course of Tarred Stone.

After the first course has been applied as above directed a second course consisting of tarred stone four inches in depth shall be applied as follows: This stone shall be crushed from a suitable grade of field stone or trap rock and shall include all that part of the crusher pro-

duct that will pass over the one-fourth inch and through the two inch perforations of a revolving crusher screen. All stone passing over the end of the screen shall be returned to the crusher and re-crushed. This stone shall be uniformly mixed with a sufficient quantity of gas tar, or a mixture of gas tar and paving pitch, in case the tar does not have the required cementing qualities to properly bind the stone together. Enough tar or tar mixture shall be used to thoroughly coat every piece of stone, but an excessive amount of tar must be avoided.

The proper proportions of tar and stone, as well as the proper proportions of tar and paving pitch required to produce satisfactory results shall be determined by the engineer, by such experiments as he shall deem advisable, and the decision of the engineer shall be final and binding. The stone shall be artificially dried and heated to a temperature of about 200 degrees Fahrenheit. This heating may be done on sheets of steel over a direct fire, or in any of the mechanical dryers manufactured for that purpose. Any stone overheated to such an extent as may be found to burn the tar and destroy its binding properties, shall be removed from the street and cannot again be used, except in the foundation course. The tarred stone shall be spread upon the street in a manner to present a perfectly uniform mixture of large and small stones so that the surface shall be uniform in texture and appearance, thus securing uniformity in wear. This course of stone shall be everywhere four inches in depth before rolling.

Rolling.

The tarred stone shall be rolled with a steam roller, weight as above specified, until in the opinion of the engineer no further compacting is possible. All places inaccessible to the roller shall be thoroughly rammed with a heavy iron rammer.

Third or Top Course.

After the tarred stone has been applied and rolled as above specified a one inch layer of tarred stone screenings, or a tarred mixture of screenings and gravel, in which the gravel shall not exceed fifty per cent of the entire bulk, shall be applied to the street and thoroughly rolled with a steam roller of the kind above specified until the surface is hard and smooth and no more compacting possible. The stone screenings and gravel must be artificially dried and heated to a temperature of about 200 degrees Fahrenheit before mixing with the tar. The stone screenings above referred to may consist of all that part of the product of the crusher, when crushing cobble stones or trap rock, that pass through the seven-eighths inch perforations of the revolving screen. The gravel above referred to shall be free from sand and not larger than three-eighths inch. After the one inch coat has been applied and rolled as above mentioned the street shall be sprinkled to the depth of one-fourth inch with stone screenings in which no pieces of stone shall be larger than one-half inch in any dimension. The roller shall pass once or twice over the entire surface of the street after the final coat of screenings has been applied, after which the street may be opened for traffic, but no travel whatever shall be allowed upon the street during its construction after the finishing of the sub-grade.

ROAD MATERIAL.

If one is about to place upon the market an article of merchandise, it must be one for which there is a demand, or for which a demand can be created. The plan must be good, the material good and the workmanship good in order that the article may be good enough to satisfy the buying public.

To manufacture a road requires the same business principles that are necessary in any other manufacturing business, and it is just the same in the manufacture of a culvert, bridge or road, whether it is to be of common earth, gravel or macadam, as in manufacturing an article for general sale.

Who would expect to make a good axe from low grade steel. To be sure, seven-eighths of the best kind of an axe are low grade steel, but the other one-eighth is high grade and this is placed at the working point of the axe. In making a road, a good road cannot be made out of only low grade material, but a good road can be made by using mostly low grade material provided the working point of the road is of the best.

The high grade steel in the axe bit costs three or four times as much as the low grade in the poll, but the axe would be worthless without it. In making a road, some of the brightest men, the most practical and sensible business men will hold up their hands in horror if one mention paying three or four dollars a cubic yard for trap rock to surface a macadam road. And yet it is just like making an axe,—the little high grade steel used, makes the whole axe high grade, so with the road, if it is surfaced with trap rock bonded with limestone, the whole road is high grade.

The best wearing stone and the best bonding stone cannot be one and the same. If limestone producers would also furnish trap rock surfacing stone, and advocate its use when bonded with limestone, they would dispel all the doubts and kicks about ruts and dust.

For the surface course of a road, mix trap rock with limestone in the proportion of two parts trap rock and one part limestone and you produce a road surface with at least three times the wearing capacity of a limestone surface, with one-third of the dust.

With gravel roads, it is sometimes impossible to make officials see the economy of screening out or washing out the surplus sand or clay in gravels, while it is nothing more or less than using common business sense to do it. If it is not done, the road is a low grade gravel road, and if it is done it becomes a high grade road.

Nature has tried to teach man how to build good gravel roads, by cementing the pebbles together in the gravel pit with disintegrated limestone, so that sometimes it is necessary to blast it in order to break it up into moveable shape. Take two parts pebbles and one part limestone screenings, put into a road bed, wet, harrow and roll them thoroughly, and a surface will be produced such as nature suggests in her gravel lumps.

When a good cook starts to make a good mince pie, that cook first secures the ingredients that will make a good pie. It would be a poor cook who would expect to make a good mince pie out of bran and water. Yet there are a lot of people who should know that the necessary ingredients must be had in order to build a good road, who try to make road out of worn out soil or sand, sometimes hauling the latter a long distance, and calling it gravel. It costs ten cents a cubic yard to shovel sand or gravel into a wagon; it costs about twenty-five cents a cubic yard per mile to haul it. Then when the road is no better for hauling on this sand, why waste time and money doing it?

The proper thing to do is to screen it at the pit, if there be over forty per cent of sand in the gravel. Put a screen on the side of the wagon opposite the pit, and throw the gravel against it. It then only costs ten cents a cubic yard for what sand is screened out, and so the higher cost of hauling the worthless stuff to the road is saved. Further, it makes the gravel you do haul a much more valuable gravel, and the road when finished is a high grade gravel road.

TESTING MICHIGAN STONE.

UNITED STATES DEPARTMENT OF AGRICULTURE, OFFICE OF PUBLIC ROADS.

WASHINGTON, D. C.

Division of Tests.

June 2, 1905.

Report on sample No. 1287 (1) of road material from Bay Port, Huron Co., Mich.

Made at the request of Wallace Stone & Lime Co., Bay Port, Mich.

DETERMINATIONS.

Specific gravity	2.64
Weight per cubic foot, pounds	165.3
Water absorbed per cubic foot, pounds.....	1.34
Per cent of wear	2.70
French coefficient of wear	14.81
Hardness	9.2
Toughness	12.
Cementing value 10 dry, 49 wet.	

Maximum, minimum, and average results on all rock species tested up to date indicated, are given in the accompanying table. An explanation of tests is given in Bulletin No. 79.

Remarks: A hard, tough dolomitic limestone which should make an excellent road material. It should be rolled wet if possible.

Respectfully,

A. S. Cushman,

Assistant Chief of Division of Tests.

March 19, 1907.

Report on sample No. 1970 (1) of road material from Jackson Co., Michigan.

(Mrs. Emma Harrington, R. D. No. 3, Jackson.)

Made at the request of W. F. Cooper, Geol. Survey, Lansing, Mich.
Material, Limestone.

DETERMINATIONS.

Specific gravity	2.60
Weight per cubic foot, pounds	162.
Water absorbed per cubic foot, pounds	2.13
Per cent of wear	5.6
French coefficient of wear	7.2
Hardness	12.7
Toughness	5.
Cementing value, Good.	

Maximum, minimum, and average results on all rock species tested up to date indicated, are given in the accompanying table.

Remarks: This rock is low in hardness and toughness and rather low in resistance to wear, with a good cementing value.

Best suited for light traffic roads.

Respectfully,
L. W. Page,
Director.

July 2, 1907.

Report on sample No. 2081 of road material from Iosco County, Mich.

Made at the request of A. Crosbie, Whittemore, Mich.

Material, Limestone.

DETERMINATIONS.

Specific gravity	2.60
Weight per cubic foot, pounds	162.
Water absorbed per cubic foot, pounds	1.94
Per cent of wear	4.5
French coefficient of wear	8.9
Hardness	12.5
Toughness	9.
Cementing value, Good.	

Maximum, minimum, and average results on all rock species tested up to date indicated are given in the accompanying table.

Remarks: A little low in hardness, toughness and resistance to wear, but with a good cementing value.

Best suited for light traffic roads.

Respectfully,
L. W. Page,
Director.

February 25, 1908.

Report on sample No. 2456 (2) of road material from Marquette County, Michigan.

Made at the request of V. S. Hillyer, Ishpeming, Michigan.

Material, Altered Diabase (trap).

DETERMINATIONS.

Specific gravity	2.65
Weight per cubic foot, pounds	165.
Water absorbed per cubic foot, pounds	1.81
Per cent of wear	4.5
French coefficient of wear	8.9
Hardness	16.0
Toughness	13.

Cementing value, Excellent.

Maximum, minimum, and average results on all rock species tested up to date indicated are given in the accompanying table.

Remarks: A rock of medium hardness, toughness and resistance to wear and excellent cementing value, should do well as a road material.

Respectfully,
L. W. Page,
Director.

July 20, 1908.

Report on sample No. 2708 (3) of road material from Schoolcraft Co., Mich.

Made at the request of W. B. Thomas, Secretary, White Marble Lime Co., Manistique, Mich.

Material, Limestone.

DETERMINATIONS.

Specific gravity	2.80
Weight per cubic foot, pounds	175.
Water absorbed per cubic foot, pounds	1.00
Per cent of wear	2.7
French coefficient of wear	14.9
Hardness	16.7
Toughness	12.

Cementing value, Good.

Maximum, minimum, and average results on all rock species tested up to date indicated are given in the accompanying table.

Remarks: A rock of medium hardness, a little low in toughness, but with a rather high resistance to wear and good cementing value. Best suited for medium traffic roads. This is the best rock of the three.

Respectfully,
L. W. Page,
Director.

July 28, 1908.

Report on sample No. 2825 (1) of road material from Marquette County, Michigan.

Property of F. B. Spear.

Made at the request of F. B. Spear & Sons, Marquette, Mich.

Material, Altered Diabase.

DETERMINATIONS.

Specific gravity	2.95
Weight per cubic foot, pounds	184.
Water absorbed per cubic foot, pounds	0.38
Per cent of wear	3.7
French coefficient of wear	10.8
Hardness	17.2
Toughness	19.
Cementing value, Good.	

Maximum, minimum, and average results on all rock species tested up to date indicated are given in the accompanying table.

Remarks: A rather hard and tough rock, with average resistance to wear and good cementing value. Should make a satisfactory road material.

Respectfully,
L. W. Page,
Director.

UNITED STATES DEPARTMENT OF AGRICULTURE.

OFFICE OF PUBLIC ROADS.

MAXIMUM AND MINIMUM RESULTS ON ROCK SAMPLES.

DIVISION OF TESTS.

Name.	Specific gravity.			Weight—pounds per cubic foot.			Water absorbed—pounds per cubic foot.		Per cent of wear.		French coefficient of wear.		Hardness.		Toughness.		Cementing value.	
	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Amphibolite.....	3.10	2.70	3.05	183	168	190	1.65	0.04	10.3	1.0	41.7	3.9	18.9	13.5	28	7	235	11
Andesite.....	3.05	2.30	2.45	184	143	153	5.18	0.13	6.8	2.1	19.4	5.9	18.7	7.9	28	7	500+	21
Basalt.....	3.00	2.40	2.85	187	150	178	6.32	0.46	14.7	3.3	30.4	2.7	19.2	5.9	39	6	500+	5
Chert.....	2.90	2.00	2.50	181	125	156	11.10	0.45	27.9	2.7	14.6	1.4	19.7	12.7	21	5	106	5
Conglomerate.....	2.60	2.50	2.55	162	156	159	3.71	2.50	12.7	3.5	11.6	3.2	9.3	9.3	.....	.....	500+	.....
Diabase.....	3.20	2.60	2.95	200	162	184	2.73	0.03	6.3	1.2	34.5	6.4	19.2	12.8	54	4	500+	2
Diorite.....	3.35	2.70	2.85	209	168	178	1.03	0.06	5.7	1.6	25.0	7.0	18.7	16.6	34	8	148	9
Dolomite.....	2.90	2.45	2.75	181	153	172	6.91	0.07	18.6	2.1	19.2	2.2	18.3	4.4	27	4	179	9
Eclolite.....	3.65	2.95	3.25	228	184	203	0.28	0.10	2.9	1.8	22.7	13.8	18.7	17.4	31	14	130	15
Epidosite.....	3.30	2.70	2.95	206	168	184	1.10	0.45	7.4	2.8	14.3	5.4	19.3	10.7	23	10	83	14
Felsite.....	2.80	2.50	2.65	175	156	165	3.13	0.02	3.4	1.9	21.3	11.8	.....	.....	.....	.....	.....	.....
Field stone.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gabbro.....	3.65	2.80	3.05	228	175	190	0.97	0.04	5.4	1.3	30.8	7.5	18.7	17.0	22	10	82	7
Gneiss.....	3.20	2.60	2.75	200	162	172	1.24	0.08	10.4	1.7	23.0	3.9	19.0	9.0	20	2	110	1
Granite.....	3.00	2.00	2.65	187	125	165	2.77	0.04	14.8	1.1	37.0	2.7	19.2	13.6	31	4	158	3
Gravel.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Limestone.....	3.10	2.00	2.65	193	125	165	13.22	0.03	34.2	1.8	21.7	1.2	19.1	0.0	23	3	500+	5
Marble.....	2.85	2.70	2.75	178	168	172	1.04	0.16	14.0	3.8	10.5	2.9	15.9	7.1	9	3	85	14
Mixed stone.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	500+	27
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	500+	96
Peridotite.....	3.55	3.25	3.40	221	203	212	0.33	0.27	4.3	3.6	11.1	9.3	15.0	15.0	12	12	30	25
Quartzite.....	3.10	2.50	2.70	193	156	168	1.53	0.05	7.6	1.6	24.5	5.3	19.7	16.5	30	5	45	0
Rhyolite.....	2.90	2.15	2.60	181	134	162	5.87	0.03	9.7	1.7	23.0	4.1	19.7	15.3	42	6	500+	10
Sandstone.....	3.10	2.00	2.65	193	125	165	11.60	0.02	32.8	1.0	40.8	1.2	19.5	0.0	60	3	500+	3
Schist.....	3.20	2.65	2.90	200	165	181	1.35	0.06	8.6	1.8	22.6	4.7	18.9	0.9	34	3	232	7
Shale.....	2.70	2.50	2.65	168	156	165	4.84	0.50	16.2	3.2	12.6	2.5	17.7	13.9	12	3	303	116
Shag.....	2.85	2.30	2.70	178	143	168	4.10	0.04	13.5	7.6	5.2	3.0	17.6	17.5	10	10	262	16
Slate.....	3.35	2.65	2.80	209	165	175	2.10	0.15	6.9	1.6	24.4	5.8	18.9	1.1	40	5	500+	7
Syenite.....	3.05	2.55	2.75	190	159	172	1.08	0.10	14.4	1.9	21.6	2.8	19.2	17.7	23	9	331	16

EXPLANATION OF RESULTS GIVEN IN THE TABLES.

RESISTANCE TO WEAR.

Resistance to wear is a special property in a rock, and although it depends to a large extent upon both the hardness and the toughness of the rock it is not an absolute function of these qualities.

The per cent of wear in the table refers to the dust and detritus below one-sixteenth of an inch in size worn off in the abrasion test. The test is made in the following manner: Eleven pounds (5 kg.) of broken rock between $1\frac{1}{4}$ and $2\frac{1}{2}$ inches in size, 50 pieces if possible, are placed in a cast-iron cylinder mounted diagonally on a shaft and slowly revolved 10,000 times.

The French coefficient of wear is obtained by dividing 40 by the per cent of wear. Thus a rock showing 4 per cent of wear has a French coefficient of wear of 10. The French engineers, who were the first to undertake road-material tests, adopted this method of recording results. They found that their best wearing rocks gave a coefficient equal to about 20. The number 20 was therefore adopted as a standard of excellence. In interpreting the results of this test a coefficient of wear below 8 is called low; from 8 to 13, medium; from 13 to 20, high; and above 20 very high. Rocks of very high resistance to wear are only suited for heavy traffic.

HARDNESS.

By hardness is meant the resistance of a rock to the grinding action of an abrasive agent like sand, and is tested as follows:

A core 1 inch in diameter, cut from the solid rock, is faced off and subjected to the grinding action of sand fed upon a revolving steel disk against which the test piece is held with a standard pressure. When the disk has made 1,000 revolutions the loss in weight of the sample is determined. In order to report these results on a definite scale which will be convenient the method has been adopted of subtracting one-third of the resulting loss in weight in grams from 20. Thus a rock losing 6 grams has a hardness of $20 - \frac{6}{3}$ or 18. Experience has shown this to be the most convenient scale for reporting results. The results of this test are interpreted as follows: Below 14, rocks are called soft; from 14 to 17, medium; above 17, hard.

TOUGHNESS.

By toughness is meant the resistance a rock offers to fracture under impact; such, for instance, as the striking blow given by a shod horse. This property is tested in a specially designed machine built on the pile driver principle, by which a standard weight is dropped upon a specially prepared test piece until it breaks. The height in centimeters of the blow which causes the rupture of the test piece is used to represent the toughness of the specimen. Results of this test are in-

terpreted so that those rocks which run below 13 are called low; from 13 to 19, medium; and above 19, high.

CEMENTING VALUE.

By cementing value is meant the binding power of the road material. Some rock dusts possess the quality of packing to a smooth, impervious mass of considerable tenacity, while others entirely lack this quality. Cementing value should not be confused with the property possessed by Portland cement, which causes it to set into a hard, stone-like mass when mixed with water. The cementation test is made as follows:

The rock sample is ground in an iron ball mill with sufficient water to form a stiff, fine-grained paste. From this paste small briquettes 1 inch (25 mm.) in diameter and 1 inch high are molded under pressure. After thorough drying the briquettes are tested under the impact of a small hammer which strikes a series of standard blows. The number of blows required to destroy the briquette is taken as a measure of the cementing value of the dust. Some rock dusts, when thoroughly dried into compact masses, immediately slake or disintegrate when immersed in water. It is considered that the tendency to act in this way is not a desirable characteristic of a road material, as it would lead to muddy conditions on the road surface after rains. The test is interpreted so that cementing values below 10 are called low; from 10 to 25, fair, from 25 to 75, good; from 75 to 100, very good; and above 100, excellent.

WEIGHT PER CUBIC FOOT.

The weight per cubic foot refers to the weight of the material in the form of a solid and not as broken stone.

Anyone having stone they desire to have tested for road building purposes should write to the Office of Public Roads, Washington, D. C., for necessary instructions as to how to proceed to secure such tests. This information will be cheerfully furnished by the officials in charge.

The sender will be required to pay all transportation charges, but aside from this, tests are made without further cost to the party desiring same.

STATE HIGHWAY DEPARTMENT

NUMBER CUBIC YARDS OF LOOSE CRUSHED STONE OR GRAVEL PER MILE.

DEPTH IN INCHES.

WIDTH IN FEET.

Foot.	1-inch.	2-inch.	3-inch.	4-inch.	5-inch.	6-inch.	7-inch.	8-inch.	9-inch.	10-inch.	11-inch.	12-inch.
1	16 8-27	32 16-27	48 8-9	65 5-27	81 13-27	97 7-9	114 2-27	130 10-27	146 2-3	162 26-27	179 7-27	195 5-9
2	32 16-27	65 5-27	97 7-9	130 10-27	162 26-27	195 5-9	228 4-27	266 20-27	293 1-3	325 25-27	358 14-27	391 1-9
3	48 8-9	97 7-9	146 2-3	195 5-9	244 4-9	293 1-3	328 2-9	391 1-9	440 4-9	488 8-9	537 7-9	586 2-3
4	65 5-27	130 10-27	195 5-9	260 20-27	325 25-27	391 1-9	456 8-27	521 13-27	586 2-3	651 23-27	717 1-27	782 2-9
5	81 13-27	162 26-27	244 4-9	325 25-27	407 11-27	488 8-9	570 10-27	651 23-27	733 1-3	814 22-27	896 8-27	977 7-9
6	97 7-9	195 5-9	293 1-3	391 1-9	488 8-9	586 2-3	694 4-9	782 2-9	880 4-9	977 7-9	1075 5-9	1173 1-3
7	114 2-27	228 4-27	342 2-9	456 8-27	570 10-27	684 4-9	798 14-27	912 16-27	1026 2-3	1140 20-27	1254 22-27	1368 8-9
8	130 10-27	260 20-27	391 1-9	521 13-27	651 23-27	782 2-9	912 16-27	1042 26-27	1173 1-3	1303 19-27	1434 2-27	1564 4-9
9	146 2-3	293 1-3	440 4-9	586 2-3	733 1-3	880 4-9	1026 2-3	1173 1-3	1320 1-3	1466 2-3	1613 1-3	1760 1-3
10	162 26-27	325 25-27	488 8-9	651 23-27	814 22-27	977 7-9	1140 20-27	1303 19-27	1466 2-3	1629 17-27	1792 16-27	1955 5-9
11	179 7-27	358 14-27	537 7-9	717 1-27	896 8-27	1075 5-9	1254 22-27	1434 2-27	1613 1-3	1792 16-27	1971 23-27	2151 1-9
12	195 5-9	391 1-9	586 2-3	782 2-9	977 7-9	1173 1-3	1368 8-9	1564 4-9	1760 1-3	1955 5-9	2151 1-9	2346 2-3
13	211 23-27	423 19-27	635 5-9	847 11-27	1059 7-27	1271 1-9	1482 26-27	1694 22-27	1906 2-3	2118 14-27	2330 10-27	2542 2-9
14	228 4-27	456 8-27	684 4-9	912 16-27	1140 20-27	1368 8-9	1597 1-27	1825 5-27	2053 1-3	2281 13-27	2509 17-27	2737 7-9
15	244 4-9	488 8-9	733 1-3	977 7-9	1222 2-9	1466 2-3	1711 1-9	1955 5-9	2200 4-9	2444 4-9	2688 8-9	2933 1-3
16	260 20-27	521 13-27	782 2-9	1042 26-27	1303 19-27	1564 4-9	1825 5-27	2085 25-27	2346 2-3	2607 11-27	2868 4-27	3128 8-9
17	277 1-27	554 2-27	831 1-9	1108 4-27	1385 5-27	1662 2-9	1939 7-27	2216 8-27	2493 1-3	2770 10-27	3047 11-27	3324 4-9
18	293 1-3	586 2-3	880 4-9	1173 1-3	1466 2-3	1760 1-3	2053 1-3	2346 2-3	2640 4-9	2933 1-3	3226 2-3	3520 4-9
19	309 17-27	619 7-27	928 8-9	1238 14-27	1548 4-27	1857 7-9	2167 11-27	2477 1-27	2786 2-3	3096 8-27	3405 25-27	3715 5-9
20	325 25-27	651 23-27	977 7-9	1303 19-27	1629 17-27	1955 5-9	2281 13-27	2607 11-27	2933 1-3	3259 7-27	3585 5-27	3911 1-9
21	342 2-9	684 4-9	1026 2-3	1368 8-9	1711 1-9	2053 1-3	2395 5-9	2737 7-9	3080 4-9	3422 2-9	3764 4-9	4106 2-3
22	358 14-27	717 1-27	1075 5-9	1434 2-27	1792 16-27	2151 1-9	2509 17-27	2868 4-27	3226 2-3	3585 5-27	3943 19-27	4302 2-9
23	374 7-27	749 17-27	1124 4-9	1496 7-27	1874 2-27	2248 8-9	2623 19-27	2998 14-27	3373 1-3	3748 4-27	4122 26-27	4497 7-9
24	391 1-9	782 2-9	1173 1-3	1564 4-9	1955 5-9	2346 2-3	2737 7-9	3128 8-9	3520 4-9	3911 1-9	4302 2-9	4683 1-3
25	407 11-27	814 22-27	1222 2-9	1629 17-27	2037 1-27	2444 4-9	2851 23-27	3259 7-27	3666 2-3	4074 2-27	4481 13-27	4888 8-9
26	423 19-27	847 11-27	1271 1-9	1694 22-27	2118 14-27	2542 2-9	2965 25-27	3389 17-27	3813 1-3	4237 1-27	4660 20-27	5084 4-9
27	440 4-9	880 4-9	1320 1-9	1760 1-3	2200 4-9	2640 4-9	3080 4-9	3520 4-9	3960 4-9	4400 4-9	4840 4-9	5280 4-9
28	456 8-27	912 16-27	1368 8-9	1825 5-27	2281 13-27	2737 7-9	3198 4-27	3650 10-27	4106 2-3	4562 26-27	5019 7-27	5475 5-9
29	473 1-27	945 5-27	1417 7-9	1890 10-27	2362 16-27	2835 5-9	3308 4-27	3780 20-27	4253 1-3	4725 25-27	5198 14-27	5671 1-9
30	488 8-9	977 7-9	1466 2-3	1955 5-9	2444 4-9	2933 1-3	3422 2-9	3911 1-9	4400 4-9	4888 8-9	5377 7-9	5866 2-3

Crushed stone will compact about 25%, and will absorb about 25% of screenings to fill voids. Gravel will compact 20%.



Top view of bridge gravel loader at Mentha, VanBuren county.

GRAVEL ROAD BUILDING IN MICHIGAN.

There are approximately 70,000 miles of public wagon road in Michigan outside of the corporate limits of cities and villages, and about ten per cent of these are now surfaced with gravel. The most of these roads, however, are of a very indifferent character, having been made by hauling all kinds of gravel on to road beds that are but imperfectly graded and drained, and therefore can in no sense be counted as permanent roads.

It is interesting to note that the percentage of gravel roads is on the increase. Up to the close of last season nearly sixty per cent of the total mileage completed under the state reward road law was macadam. Since that date the ratio has changed, as nearly sixty per cent of the roads built this season on which reward was applied for, have been gravel; and it is probable that, as the work of permanent road building increases, the percentage of gravel roads will increase until it becomes fully seventy-five per cent of all the roads on which state aid is asked.

Thus it is plain that gravel is by far the most important material that must enter into the substantial improvement of the country roads in Michigan. It has many advantages over stone. No expensive machinery is required. A skillful foreman, the commonest kind of labor and such tools as can be found in any farming community will construct as good gravel roads as can be made. And last, but not least, no money is sent out of the neighborhood, for it is a labor proposition from start to finish.

The bank gravels of Michigan are all of glacial origin and vary quite widely in their character, both as to the kinds of rock of which the pebbles are rounded fragments and the kinds of earth with which they are mixed. This variation is most marked where the gravels of different sections of the state are compared.

The rims of limestone ledges that surround the northerly ends of Lake Huron and Michigan and the straits of Mackinac and outcrop at intervals in Menominee, Delta, Schoolcraft, Mackinac, and Chippewa counties of the upper peninsula, and in Alpena, Presque Isle, Cheboygan, Emmet and Charlevoix counties of lower Michigan, seem to have materially influenced the gravels in those counties and for some distance southward, by contributing a large proportion of limestone pebbles. Farther south and in the interior of the state the pebbles represent a larger percentage of igneous rock, such as granite and trap and also much quartz. It is probable that these came from the harder rocks to the north of Lake Huron, and that a considerable quantity of the softer rocks were ground to powder in transit.

The same variation is to a greater extent apparent in the cobble stones, or boulders covering these areas.

Good roads have been built from all of these gravels. The ideal gravel road is a stone road, the stones being in the form of pebbles and ranging in size from that of small peas to that of English walnuts. The

mass should contain only enough finer material, varying in size from coarse sand or finely divided earth, to the finest particles of stone dust, to completely fill the voids, cement the pebbles together and form a hard waterproof crust when well compacted on the roadway.

Authorities have differed somewhat as to the requirements of suitable road gravels, most of them in my opinion, placing too much stress on the immediate packing qualities. Indeed the average township commissioner and farmers generally have become so imbued with the necessity of securing a gravel that will pack quickly that they have almost lost sight of the fact that the only thing that makes a gravel road better than an earth road is the pebbles—real stones—that it contains and is solely dependent upon to bear up the traffic and resist wear.

Some authorities specify much larger pebbles than have been required by many modern builders. An attempt to follow such specifications in Michigan with the general run of our gravels would make gravel road building so expensive that it would be practically prohibitive, and would necessarily discard many whole pits from which excellent roads have been made.

The most common material sought after for the binder in road gravels is clay. But, considering all kinds of weather, it is probably the poorest cementing material we have. If present much in excess of twenty per cent of the mass it makes muddy roads whenever there is a wet spell. At best it is the most treacherous substance we are sometimes forced to use for that purpose.

It is the gravel containing an excess of clay that always breaks up in the spring when the frost is coming out, while the gravels that depend mostly on iron oxide and stone dust for their cementing qualities are always good, whether the road is wet or dry, frozen in winter or baked in the hot summer sun.

Gravels that come from the pit with the pebbles cemented together, even though they contain no clay, will re-consolidate in the road and become harder than they were in the pit. Tests of a specimen of that kind always show a lime reaction, and this lime is usually accompanied with iron, due to the fact that water flowing over the lime has a tendency to deposit its iron contents.

Immediate heavy rolling will not do much to consolidate a gravel road. Dry rolling is a detriment rather than a benefit except to discover soft spots in the sub-grade, unless the gravel contains so much material of a clayey nature as to be objectionable for the reasons above cited. Experience with gravel road soon teaches that gravel will not "come down" under the roller like macadam, but on the contrary requires considerable traffic to properly harden it.

In the early stages no compacting tool is so efficient as a spike toothed land harrow, especially one that permits of tilting the teeth backward. This harrowing should begin with the first layer of gravel, as soon as three or four hundred feet of the road has been covered, and kept up every day thereafter during construction unless the road becomes so firm that the harrow teeth make little impression. One or two rounds at a time are sufficient, preferably at noon and at night, so as to keep the wheel tracks continually filled. It is apparent that the gravel should be spread beginning at the end of the road nearest the pit and teamed over as the work progresses.



Side view of bridge gravel loader at Mentha, VanBuren county.

After the first rain that thoroughly saturates the road, or if no rain comes it will be necessary to sprinkle, begin to roll and also to work the harrow all the time the rolling is in progress. At first it is well to use a land roller, weighted as much as it will stand, but as the road becomes firmer a heavier roller hastens the packing and wherever possible a much heavier horse roller, or a steam roller, weighing not over ten tons, should be used. This treatment applies alike to each of the courses, and no one should expect to build a first-class gravel road without applying the gravel in at least two distinct layers and compacting each layer separately.

Even with the treatment above outlined no gravel road becomes perfect until it has been traveled for some time, usually not until the second season after it is built. During all of this formative period it must be carefully looked after and kept free from wheel ruts and hollows. It can usually be kept smooth by the systematic use of the float or drag, or sometimes by the skillful use of the road grader. The last named tool, however, often does much damage by digging up hard places, while the former tools simply shove the loose gravel forward gradually pushing enough of it towards the center of the road to preserve the crown, but always depositing it where there is any depression. Whenever there is an extra deep wheel track or evidence of rutting and not enough loose gravel to completely fill the depressions, a little new gravel of the best quality should be put on before the floating is done.

This work should always be done immediately after rains, preferably when the water is still standing in the depressions, so that they can be seen more readily. At such times the gravel is in the best possible condition for packing and uniting with the hardened road bed.

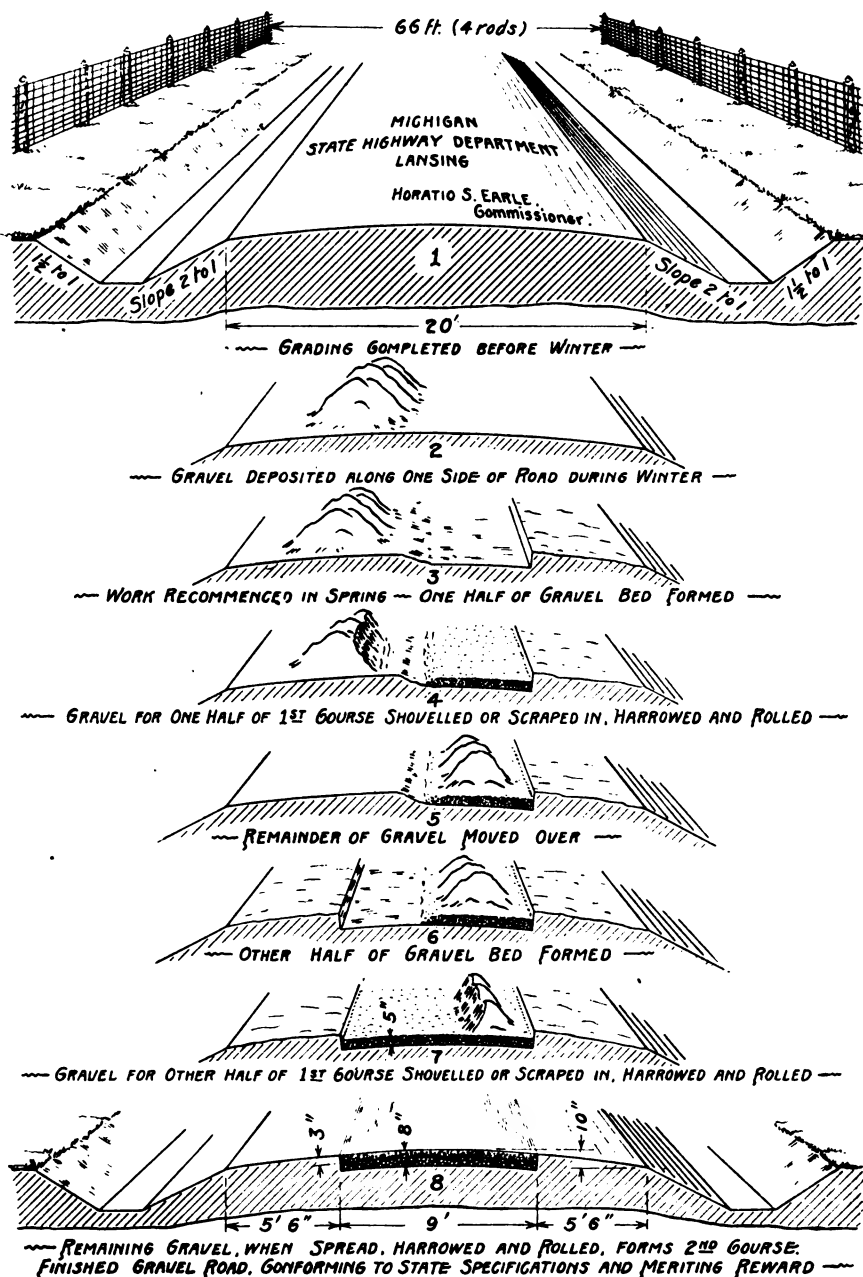
To form a perfectly hard road in the manner above described it is necessary that the gravel be placed on a well drained and well graded road bed, and it must be properly supported on each side with shoulders of firm earth, cinders or other suitable material, so the sides cannot press out under the roller or the wheels of wagons and thus allow the gravel to waste away to the side ditches.

The wearing qualities of the road after it has been properly consolidated are almost entirely due to the ability of the pebbles to resist crushing and abrasion. There are few gravels in Michigan that do not contain plenty of limestone pebbles to crush and wear into dust and thus supply all of the finer particles required for binder, leaving the hard pebbles to take the actual wear.

The best pebbles are the traps and tougher granites. Quartz pebbles are rather easily crushed into sand after which they are of little further use to the road, for in this condition they have practically no cementing value.

However at the present stage of road building in Michigan, when gravels with or without screening can be found containing sufficient proportion of good sound pebbles which are fragments of good sound rocks, we must not be too critical as to the mineral composition of the rocks of which the pebbles are composed.

~PLAN FOR BUILDING STATE REWARD GRAVEL ROAD~
 IN WHICH THE GRAVEL MAY BE HAULED DURING THE WINTER



WINTER GRAVEL ROAD BUILDING.

In localities where gravel has to be hauled several miles, much money can be saved by doing this hauling in the winter time. The road must be properly graded and drained in the fall and be made ready for the gravel.

In Manistee county, the county road commissioners make their roads twenty-four feet wide on the top, this gives plenty of room to put their gravel on in the center, ten feet wide, leaving room on each side for a winter or snow road.

In the spring with a road grader they shove all but what is needed for the bottom course to one side. This course is compacted with a roller and the road grader is then used to shove back the gravel for the upper course, which is thoroughly rolled.

They do not make any earth shoulders, but put on sufficient gravel for a width of nine feet or more in the center, so it will compact to eight inches deep or more, and then allow it to wing out, so that it is from sixteen to twenty feet wide, believing it cheaper to do this than to form earth shoulders.

Their gravel roads are good enough to merit the highest praise, and I can recommend other county commissioners to Manistee county for a study of this plan.

For graveling roads eighteen or twenty feet wide the plan illustrated is suggested as a proper one when hauling the gravel on in winter time.

Have your road well graded and drained in the fall, in the winter dump the gravel at one side of the road leaving the other side open for travel. In the spring form your gravel bed and shoulders and scrape enough gravel in the bed to make the lower course. Compact this with a roller and harrow, and scrape on the second course. (See illustration opposite).

While this plan shows shoulders of earth, it will be perfectly satisfactory to the state highway department to have the gravel in the center nine feet wide and eight inches deep when compacted, *and it must be compacted in two courses*, and then let it wing out to a thin layer at the sides, so the gravel will be about fifteen feet wide.

If there is plenty of gravel near by, this kind of a road will not cost very much more to build than one nine feet wide with shoulders formed, and is a much better road, for gravel can be scraped in from the sides to fill up the ruts that will form later.

GRAVITY GRAVEL LOADING AND SCREENING DEVICE.

In some parts of the state there are immense gravel deposits that contain so much sand that roads built of it will not merit state reward.

The gravity gravel loading and screening device has been designed for the purpose of screening the gravel and loading it and the sand into separate wagons at the same time.

It is handed out merely as a suggestion, and I do not presume to say that it will work uniformly and perfectly and if anyone should build one I desire that he should act according to his own judgment when he does so.

Should anyone build such a device I wish he would be so kind as to report it to the state highway department, with a full description of the work done by it.

SAND-CLAY AND CLAY-SAND ROADS.

You cannot play a tune on a chunk of iron ore, but you can make that ore into steel and the steel into piano strings, and on those you can (if you know how) play a tune, and all in hearing will enjoy the music.

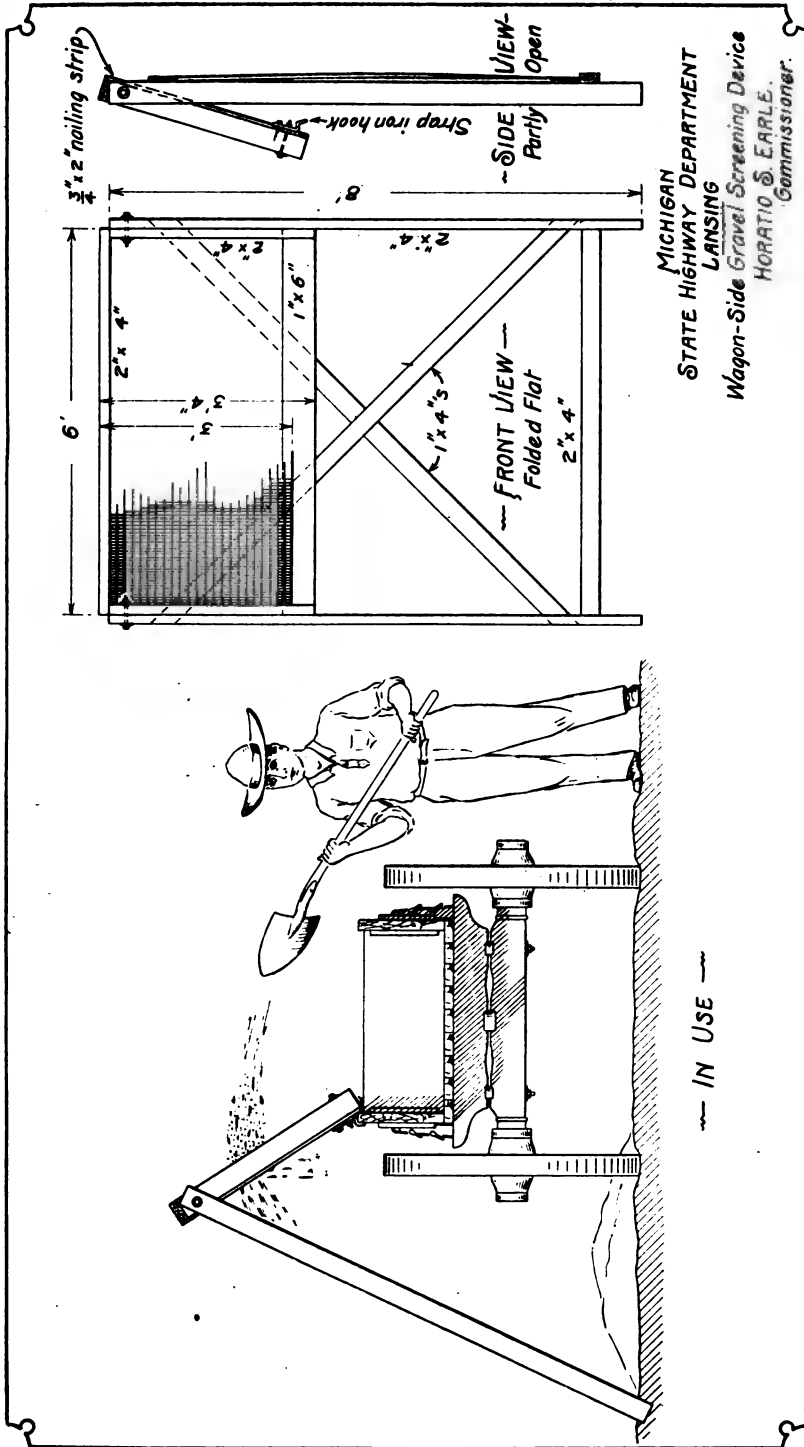
But all this takes brains, energy and money.

You cannot haul a load or ride in a carriage of any kind and get either profit or pleasure out of it, over a dry sand or a wet clay road, but sand and clay can be mixed with brains, energy and money, so it will make profitable hauling and pleasant driving on that road.

"United we stand, divided we fall." If common sense and road building skill are used in the mixing of sand and clay, the two united can be made into a mighty good road, but when separate or improperly mixed they make a mighty poor one. The scientific mixture, providing a perfect mixture could be accomplished, would be to use just as much clay as it would take of water to fill up the voids in the sand, but a perfect mixture cannot be made, so somewhat more than enough clay to fill the voids should be used. About two-thirds sand and one-third clay are the proper quantities of each to use.

First make your road bed by scraping out the sand from the center of your road, then put two inches of dry clay in this bed and scrape onto it four inches of sand. Harrow them until thoroughly mixed and roll with a weighted field roller. Then put on another two inches of clay and four inches more of sand, mixing them in the same way thoroughly and rolling with the weighted field roller. In this way you will have a fairly good road at a very small cost.

Where the ground is clay and a better road is desired, by all means turnpike it and gravel it according to state specifications and get a reward of five hundred dollars a mile from the state, providing the road is of enough importance to warrant so much cost, but there are ten



miles of road in Michigan that are not of sufficient consequence to every five miles that are.

If your road is one of these less important ones, and it is desired to improve it at a cost of one to two hundred dollars a mile, first turn-pike it. Drain it thoroughly, this is the main thing. When you are turnpiking it, throw up shoulders some higher than the center of the road, and about ten feet apart. Draw in four inches of sand ten feet wide, then scrape in two inches of dry clay on top. Harrow thoroughly and roll with a weighted field roller. Leave it for a while in this condition, until after some heavy rains, then if it is too sticky, add more sand, and harrow and roll again. After more rain, while the road is wet, go on it with your road drag and shove a little of the clay on the side, up into the sand, and keep doing this after each rain through the first year, and a road will be obtained at a small cost that will be a very decided improvement on the old one.

EASEL GRAVEL SCREENING DEVICE.

A cheap way to get the sand out of gravel so as to bring the standard up to the requirements of the state specifications, is to make an easel screening device that fits onto the side of the wagon opposite the gravel bank.

When loading, throw one shovel full in three, or one in two, or all, as may be required, upon the screen. A sufficient amount of the sand will go through the screen and on the far side of the wagon, to bring the gravel that falls into the wagon up to the desired standard.

ROAD MAINTENANCE.

Some have an idea that permanent roads, so-called, will or should, last forever without any repairs, because they cost so much to build. With that same kind of reasoning, we would have a right to expect that a modern threshing machine that costs several thousand times as much as the old-fashioned flail, ought to last forever without a cent expended for repairs. And that, while a violin that costs three dollars has to be tuned and have new strings, one costing a thousand dollars should never need new strings and should always stay in tune.

A good road is worth, for business or pleasure, several times as much as a bad road, and some portion of this we can afford to expend in keeping it in good condition. The permanency of the road depends upon its being kept in perfect repair.

MACADAM ROADS.

When you get your trousers from the tailor you find in the hip pocket some patch cloth; the tailor knows that some time there will

come need of it, and you will desire to have some of the same kind of cloth.

No macadam road is going to be permanent unless you keep the coarser stones covered up. A floor will never wear out if you keep it carpeted, and just the same treatment will keep the road from wearing out, carpet it, patch it, but patch it and carpet it with the same kind of material as it is made of, crushed stone, and not with mud from the shoulders or ditches. A highway commissioner or pathmaster who will scrape a lot of mud on top of a gravel or stone road ought to be put out of office by main force and sued for damages besides.

Every contractor should be required to leave at least five cubic yards of stone chips, to the mile, not dust, but chips measuring from one-eighth inch to three-quarters inch, and whenever there is a depression that will hold a quart of water, put in a quart of stone and a little more. If this is done three or four times a year over all your macadam roads you will be surprised how little it costs to keep them in repair. However, if allowed to get out of repair you will be as much surprised to see how quickly they will go to pieces. The best way is, if you do not intend to keep them in perfect repair, don't ever pay out the money to build them.

GRAVEL ROADS.

These are the ideal country roads if you have the right quality of gravel. They are easy to repair, they rut quicker than macadam for two reasons—first, the stones in the gravel are round and the tires of the wagons going over them unbond them, and they roll to the side of the wheel track. Second, a large part of the pebbles are of soft stone and they crush beneath the weight of the heavy loads. This dust is washed or blown away so that the wheel track is growing lower all the time.

It is an easy matter, though, to string along in the wheel tracks in a wet time, sufficient gravel to fill the ruts, and after this is done, get out your road drag and gather a little of the powdered gravel up on top of your new gravel and you will find it will be but a day or two until your road is as smooth and as good as when brand new.

SAND—CLAY ROADS.

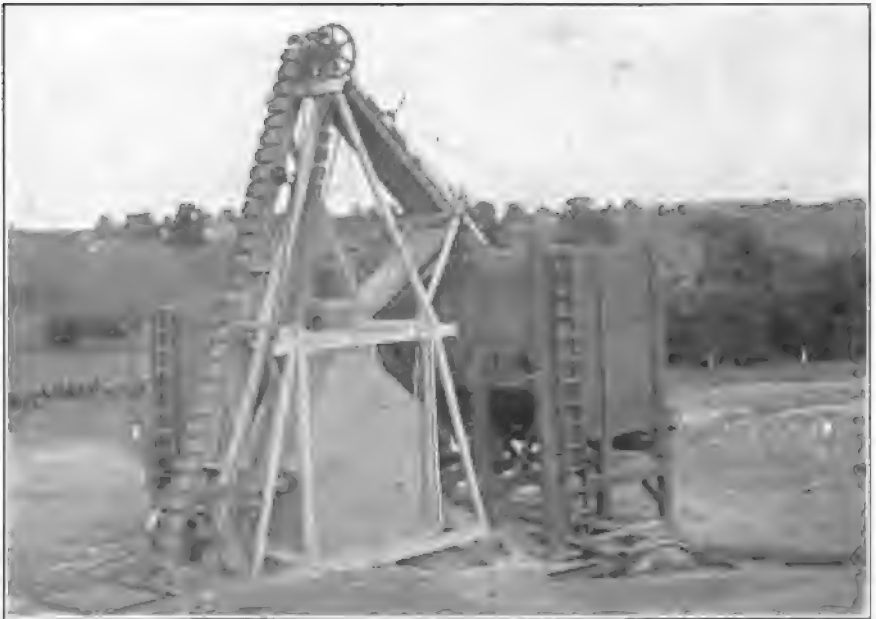
A little more sand generally is all that is needed, but sometimes it takes a little clay too. If it is sticky add a little sand and roll it down. If it is too sandy, harrow in a little clay and roll it down. Keep your road smooth with your road drag.

All kinds of roads have culverts, bridges and ditches, and these should always be attended to. Paint all iron and woodwork. Keep all culverts and ditches open.

Down in the Eastern States the farmers have learned that it means money in their pockets to drive in different places in the road, and you will see them, when they notice a road beginning to rut ever so little,



Revolving gravel screen. Coarse stones go over end of screen, sand in first bin, second course in second bin and first course in third bin.



Gravity gravel screen. Elevator 30 feet high. Pit 5 feet deep. Screen 11 feet 4 inches long. Run by 4-horse power gasoline engine in house. Elevates 100 cubic yards in 10 hours. Gravel bin holds 27 yards, sand bin 8 yards. Has a hammer to keep screen from clogging.

turn out so as not to drive in the same old wheel track. Michigan farmers haven't learned this yet. They like to get in a rut and stay there, but they'll soon see the folly of it, and then a whole lot of the expense of maintenance will be done away with.

Another destroyer of roads is the narrow tired wagon. A law should be passed prohibiting the sale or use of wagons with narrow tires.

WIDE TIRES.

A man who would go to work and build a fine board fence along the road side and then cover it with kerosene oil and set it on fire, would be adjudged a fool or a lunatic; yet he does not exhibit much greater foolishness or lunacy than do townships, counties and states that permit the hauling of heavy loads in narrow tired wagons on fine macadam and gravel roads. It is simply burning up money to build a first-class road and then allow the hauling of three, four, and, in some cases, six tons over them on tires two or two and a half inches wide.

A great deal of our gravel is composed largely of limestone pebbles, these cannot stand the weight placed on them by narrow tires and heavy loads.

A law should be enacted by the coming legislature that would prohibit the selling of wagons with improper width tires after January 1st, 1912, and would prohibit hauling a load greater than a ton on a wagon with tires an inch wide, two tons on a wagon with tires two inches wide, three tons on a tire three inches wide and so on up to five tons; no loads of greater weight than five tons to be allowed, without permission is obtainable from the township or county commissioners.

CHAINS AND SPIKES ON AUTOMOBILE TIRES.

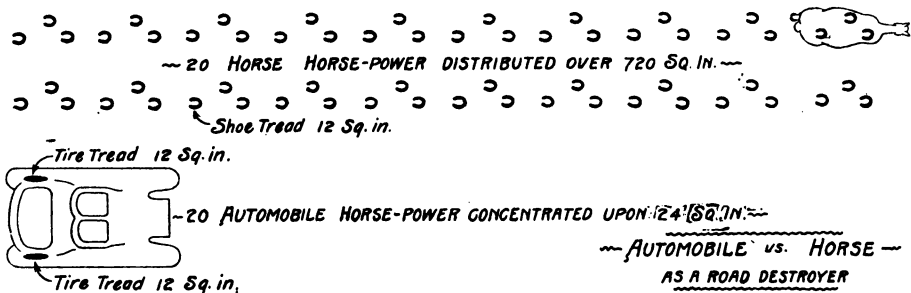
There is a law on the statute books at the present time which prohibits damaging the roads by hauling logs upon the road surface or any other way. The fine is three times the amount of damage and the money so obtained is to be used on the roads. I believe this law will apply as well to automobiles with chains and spikes on the tires as it does to logs, and the township highway commissioners should take action under it to prevent the owners of automobiles from using such damaging contrivances on gravel or stone roads.

AUTO-PROOF, WATER-PROOF, DUSTLESS, DURABLE ROADS.

In order to meet the conditions of today our through roads should be hard, dry, dustless, smooth, durable and resilient.

The farmer alone and unaided cannot be expected to build such roads. Who should build them? The ones indirectly benefited should pay their share toward the cost, but those who use them most, to whom they are of greatest benefit, and who are responsible for the most of the wear on them should pay the larger part of the cost of construction and repair.

An estimate of how much each should pay can be easily made. The pedestrian uses them comparatively not at all and there is no wear as a result of his use. Bicycle riding is on the decrease and the use and wear by those using this form of locomotion is so small as to be of little consideration. The horse uses it a great deal and the wear therefrom is considerable. The automobile, while not as commonly used as the horse, does much more damage to the roads while being used. Then the main part of the cost should be borne by the owners of the horse and the automobile. To estimate how much each should pay, let us study the following diagram.



When hauling, each foot of the horse covers twelve square inches of road surface. Allowing that the horse has three feet on the ground at one time, each horse covers thirty-six square inches and the "pull" of one horse is distributed over that surface. Automobiles are branded ten horse-power, twenty horse-power, forty horse-power, etc. Accepting this as correct and taking a twenty horse-power machine for an illustration, we place twenty horses along side the machine. Twenty horses would engage, while hauling, seven hundred twenty square inches of road, or the "pull" would be distributed over that area. The tire tread of the drivers of the automobile is about twelve square inches, the same as one foot of the horse. The two tires would engage twenty-four square inches. So under automobile traffic with a twenty horse-power machine, twenty-four square inches of road must withstand the

same power, pull and strain as seven hundred twenty inches covered by the twenty horses.

Is it any wonder the stones or pebbles or earth on which the automobile tire stands, is pulled back from the stones, pebbles or earth in front of them?

Is it any more than fair to ask that each beneficiary from the use of the road should pay for that use, on the basis of paying for the damage done?

Then if the automobile pulls thirty times as hard on each square inch of road as does the horse, it is pulling the road to pieces thirty times as fast. But the abrasion wear of the horse's shoe and steel wagon tire are more than that of the automobile tire, so, deducting one-third for this, we find the net damage done by the automobile, over and above that of the horses of the same pulling power, is twenty times as much.

Then the owner of a twenty horse-power automobile should pay the same for using the road as the owner of twenty horses pays. This is dealing very liberally with the automobile owners for there are three destructive features of the automobile which have not been considered,—the suction of the tire, the near-vacuum in the rear of the automobile, and the whirlwind created by wheels moving at from three to four hundred revolutions a minute, all of which destroy the bonding properties of the road, by lifting up the dust so the wind catches it and blows it off the road, leaving the stones or pebbles exposed.

This does not mean that we think the automobile should be put out of business, for we do not, and we hope that because of them the roads will more rapidly be permanently improved, but the fact remains nevertheless that they are road destroyers as our gravel and stone roads are now constructed.

In order that the travel of the automobile may bring about an improved condition of the roads, we hope there will be a tremendous increase in the number of them, and that the owners will be taxed for the amount they wear or tear out the roads, and for their share of the cost of improvements.

Horses are valued for taxing purposes at about one hundred dollars each, therefore, if the pull of one twenty horse-power automobile does twenty times as much damage to the road as the pull of twenty horses, the owner of a twenty horse-power automobile should be willing to pay in road tax on his machine as much as the owner of twenty horses pays.

The average valuation of a horse is one hundred dollars, and the average road tax is three mills, so it amounts on an average to a tax of thirty cents on each horse. Then the license tax on automobiles should be thirty cents a horse power per year,—three dollars a year for a ten horse-power machine, six dollars for a twenty horse-power machine, twelve dollars for forty horse-power, etc. All over the cost of collecting should be, as now, turned over to the state highway department to be used in building roads good enough to withstand automobile traffic. Wherever this travel is heavy, all gravel and macadam roads should be given a tar surface, and after the farmer has built roads good enough to withstand horse traffic, there is no justice in compelling

him to pay additional taxes to build them sufficiently good to withstand automobile travel.

It is possible to build roads that are auto-proof, water-proof, dustless and durable provided sufficient money is furnished. The state of Michigan has the money but it will depend upon the legislature whether it will be appropriated for roads or not. There should be an extra reward paid for tar surfaced roads that are built to withstand automobile traffic and the money obtained from the automobile licenses should pay this reward.

Commissioners and others interested in tarred roads can see them at Detroit, South Haven and Escanaba. Plans and specifications for building them can be had free from the state highway department.

And an automobilist who will use chains or spikes on the tires of his automobile when traveling over a gravel or stone road, should be obliged to pay three times the amount of tax that would otherwise be assessed against his machine, for the amount of damage done in this way is inestimable.

AUTOMOBILES.

There are some people in this country of ours, who hate the automobile and the automobilist and who say they are opposed to making the roads any better, out of spite. Allow me to call your attention to some figures that can be proven to be correct. The product of the automobile factories of Michigan sold for \$18,000,000 in one year alone and \$14,000,000 of this money came from outside of Michigan, to Michigan. It came from the rich and well-to-do, and went to the manufacturers, but did not stay with them. It went from them to the employees and the stockholders, and from there to the stores, and from the stores to the farmers—for pork, mutton, beef, oats, wheat, corn—for wool—for all your produce.

A good deal of our prosperity has been generated by the rich and well-to-do buying automobiles and so putting oceans of money into circulation in Michigan.

ROAD DRAGS AND COMMON SENSE.

An earth road reminds me of a balky horse, whose disposition is never to haul a large load, and only to haul a small one for a short distance when well treated.

I'd as soon think of making a poor horse fat with a curry comb, as I would of making a good earth road out of a poor earth road by the use of a road drag.

'Tis true that a curry comb, if a good one and properly used, will help other agencies to fatten a horse; it is also true that a common sense drag used in a common sense way will better the surface of an earth road.

Should you find a horse lying on his side in the mud, dead, you would not expect to resurrect him and make him work good and look good with a curry comb, and to expect to make a good road out of a poor road lying in the mud, by the use of a drag is just as nonsensical—all the oratory of the “cheap road” enthusiasts to the contrary notwithstanding.

Get the water off, out and away from your earth road. If you cannot do this any other way, grow the road; this may take a deal of cultivation, but it can be done by dragging in common sense and mixing with it some money.

When your road is turn-piked up sufficiently to allow the water to get off, out and away, then it is your bounden duty to keep that road as smooth, as dry and as hard as is possible. There are many ways to do this. Probably the best one is to cover the traveled track of the road with a bitumenized macadam but this would cost all of fifteen thousand dollars a mile so is out of the question for country roads; next brick—but that is too high in cost, and cities only can afford to have asphalt. Common macadam is the best covering for a road, that is inexpensive enough for rural districts, but it is altogether likely that not to exceed ten per cent of the country roads are of sufficient importance to warrant the cost of macadam. Gravel, if of the right kind, makes an ideal country road, but probably not more than twenty-five per cent of the roads are sufficiently important to warrant graveling.

So we have about two-thirds of the roads of the country that must of necessity always remain earth roads and will never be covered with any foreign substance, but will be made and kept in repair with the material at hand. On these roads we need to drag in a whole lot of common sense.

What is good for a sand road is the wrong thing for a clay or gravel road, in fact it is as necessary to diagnose the sickness which afflicts a road as it is for a doctor to examine a patient whom he is called to attend. When the disease has been located and its nature known, then it is time to write the proper prescription and see that it is filled and followed.

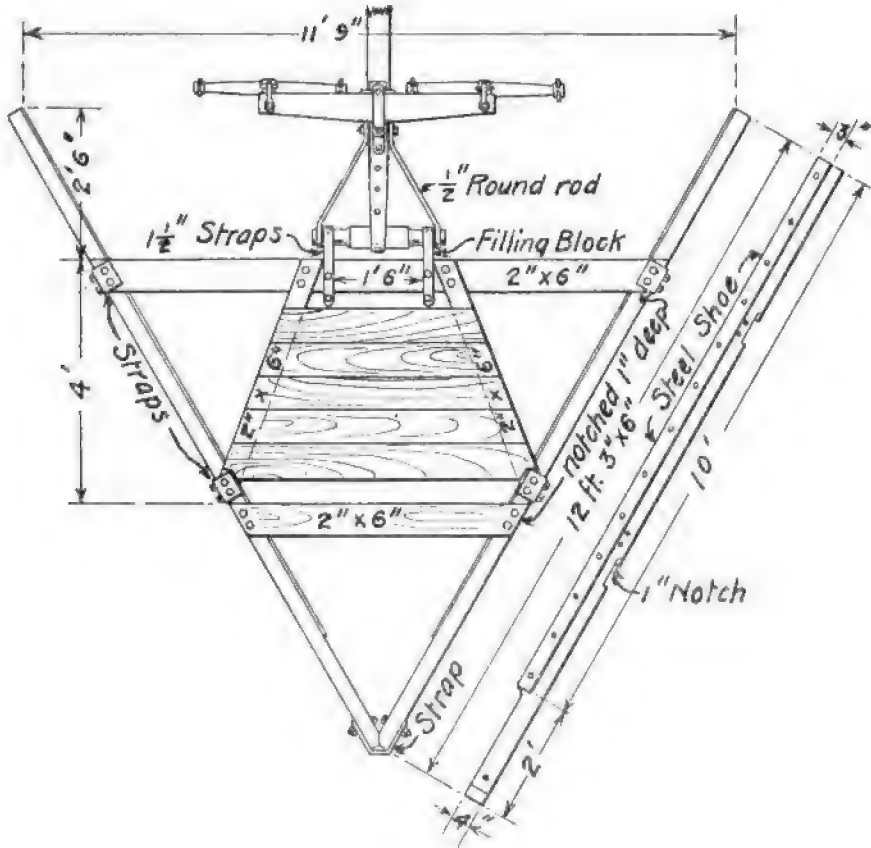
A sand road can in no case be made a good road by dragging it, and clay roads that have not been properly graded and drained, cannot be greatly improved by the use of the drag until such time as they have been so graded and drained.

Then we must use common sense. The man at the road must have his common sense along with him and do what needs doing to cure the road of its disease. After it is cured protect it from all further inclement weather by a covering of stone if you can afford it; if not, gravel, and if that is too expensive, then if it's sand—clay it; if it is clay—sand it; and after the sand and clay are well mixed, in either case it will improve that road to keep it smooth with a drag.

MICHIGAN
STATE HIGHWAY DEPARTMENT
LANSING

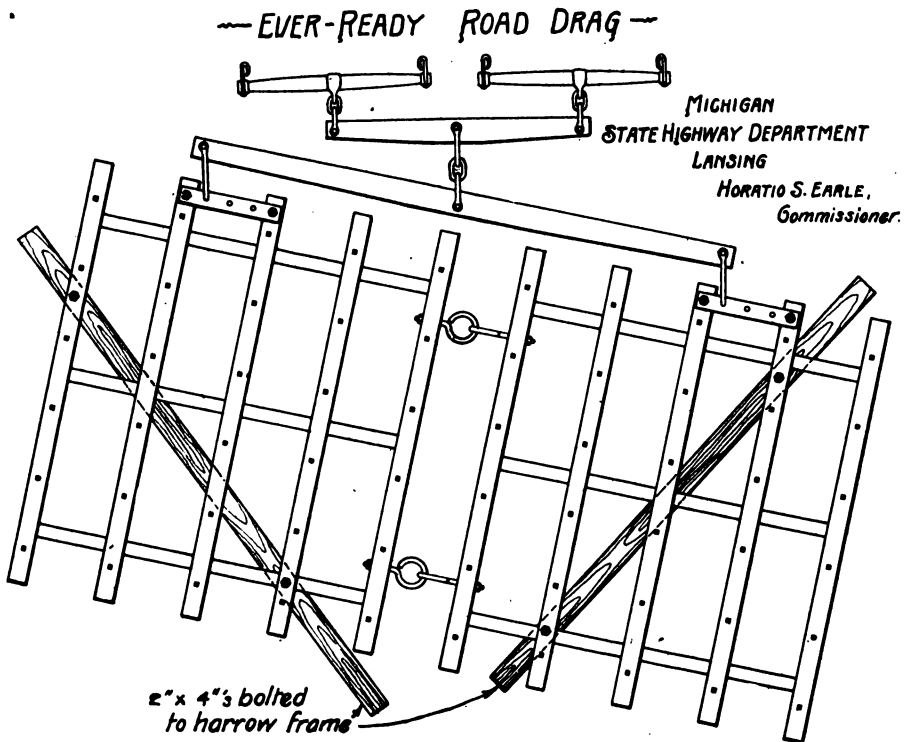
HORATIO S. EARLE,
Commissioner.

— GRANT RUT-OUT —



The above home-made road drag has been quite extensively used by highway commissioners throughout the state and has proven very satisfactory, being inexpensive and durable and giving excellent results.

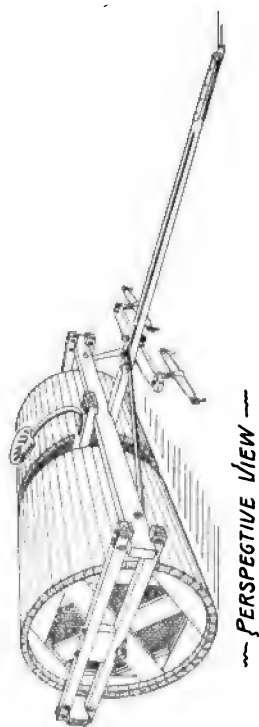
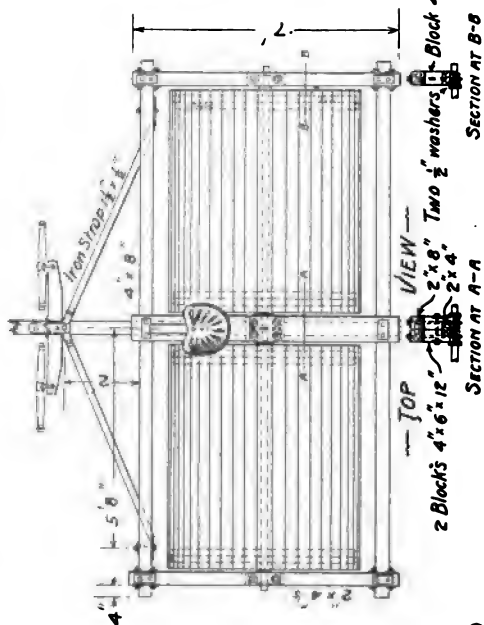
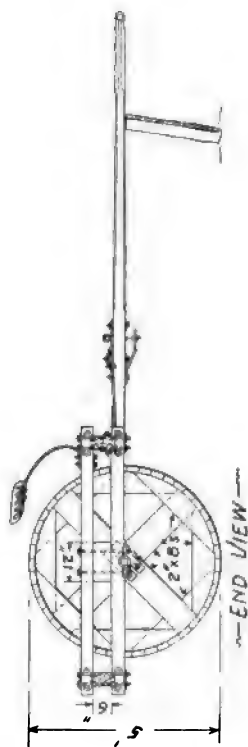
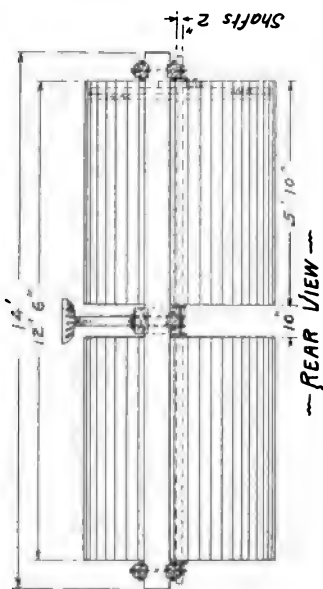
This drag can be used on snow to good effect, with the pointed end forward, which can be easily brought about by turning the wings around so as to get the steel faces to the front, then unbolt the side pieces which hold the tongue roll, turn the tongue around, put on whatever weight is needed and you have a very good cheap snowplow.



EVER READY ROAD DRAG.

A spike tooth harrow can be made into a fairly good drag in half an hour.

Take two sticks of timber nearly or quite as thick as the length the harrow teeth protrude below the frame. Bore holes through them a trifle smaller than the diameter of the teeth so they may be driven over the teeth diagonally and bolted to the harrow frame—(See illustration.) Leave an open space between the ends of the sticks to permit the earth to be distributed in the ruts, and you have the ever-ready road drag at hand for use. Drag this over a wet road and it will fill the ruts, puddle the ground and improve the road.



MICHIGAN
STATE HIGHWAY DEPARTMENT
LANSING
-- Home-made Vermont Snow Roller --
HORATIO S. EARLE,
Commissioner.

ROLLING SNOW.

Rolling snow has advantages over plowing it. Plowing throws up shoulders on either side, that have a tendency to catch and hold between them all the snow blowing across the road, and so soon filling up this plowed-out space. Rolling packs the snow all over the road and leaves no ridges to cause future drifts.

However, if rolling is to be practiced, it is absolutely necessary to begin with the first snow, and to keep it up, for it is impossible to satisfactorily roll deep snow.

Any highway commissioner can make a roller after the plan shown on opposite page, it should be built of oak, should cost about \$75, and weigh about 3,000 pounds and is sufficiently large and heavy for ordinary use.

SWAMP ROADS.

To say just how best to build a good road or even a fair road over swampy ground, is something that no sane road builder will attempt to do. The main reason why is, that there are seldom two swamps alike, and so what has worked well in one place would be worthless in another place. About the only thing I can do, is to relate some things that have been done, and let you take your choice, without any guarantee that they will produce a cure in your particular piece of road.

One man had been drawing gravel for years. Each year it sank and the road was no better than before. He drew cobblestones in the winter time and threw them into the ditches along side of the road, in the spring they sank, next winter he did the same thing, in the spring they sank some, but not out of sight. The result was he had two walls on either side of his road so that the muck could not ooze to the side, and there has been no sinking of his road since.

A prominent railroad engineer says that generally it is best not to break the sod across a swamp but to haul on the earth to build up your turnpike, first making a mat of small trees and brush and placing your earth on top of this mat. He says he built a railroad grade in this way across a swamp which was so soft that he could run a pole down thirty feet by hand, and the grade has stayed up without any trouble for over ten years.

Another man instead of building a corduroy road, took the logs and drove them down endwise beside the road, using logs sixteen feet long. He drove them with a hand pile driver made out of an elm butt with three handles, so that three men could use it. These logs kept the muck from oozing to the sides, and proved very satisfactory.

Where you have a soft spot in your road, it can often be improved by putting a layer of swale grass or rye straw or hay over it and then putting your gravel on top of that. The hay or straw is not a water carrier and will generally hold up the grade until the gravel has a chance to pack, after which there will be no further trouble.

is usually cheaper to make it for this purpose. It is an easy way to fill up a bog hole. The fill must be, by running the material to the bottom. Then figure on a road bed with side slopes of two to one, that is with a vertical rise of one foot at the end of each foot going down. The road bed is twenty-seven feet long, one foot deep and wide enough for a team. Then the number of loads of material and the cost of the whole can easily be determined.

BOG SWAMP REMEDY.

This remedy is suggested but not endorsed. It is handed out for information it may be worth.

The township, which invented it, tried it without any tar protection and reports that it has not ~~sunder~~ enough to notice.

Of course it would not answer for a long distance unless piles were driven down and mud sills laid on top of these piles across the road to support the driveway.

This plan is a combination of a floating and a suspension bridge. The amount of wire shown in illustration is altogether too little to support the road, but it will assist, and if the soil is not cut on the sides the salt underneath can come and the mat of brush and hay is laid wide enough and thick enough to form a raft for the road, the probability is, that good results will be obtained.

No brush should be laid having sticks over two inches in diameter, but of the twigs should be left on, enough brush should be laid to form a good strong bed. Then lay a covering of swamp hay, enough so a man can walk on it without his feet going through into the bog. Upon this lay a covering of tar paper and on the tar paper slush tar, about half a gallon to each square yard. The tar will need to be hot but not red enough to burn. Spread into this gravel with no clay or earth in it. When it has hardened repeat the above three thicknesses of common wire fencing as wide as you are to build your turnpike, spike the ends firmly to timbers in trenches at both ends of your bog, fill these trenches with concrete. When it has set put on two more coats of tar and gravel so as to thoroughly bind your wire fencing in the concrete.

Put on about six inches of gravel and you have your suspension-floating bridge completed.

But don't build it unless your own common sense makes you believe it will answer your purpose. If you do build, kindly notify the state highway department how it works.

— PLAN FOR BUILDING ROAD ACROSS BOG —

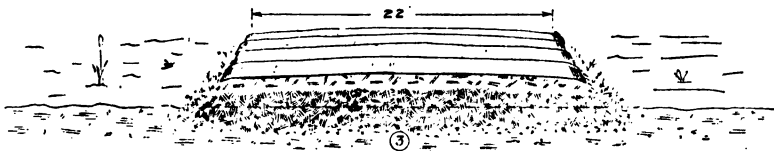
MICHIGAN
STATE HIGHWAY DEPARTMENT
LANSING
HORATIO S. EARLE,
Commissioner.



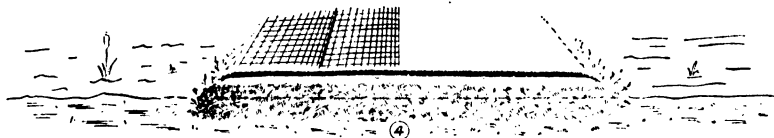
① — PROFILE OF BOG ALONG CENTER LINE OF PROPOSED ROAD —



② — PROFILE—PROPOSED ROADWAY COVERED WITH A MAT OF BRUSH 2 OR 3 FEET DEEP, WELL COVERED WITH STRAW —



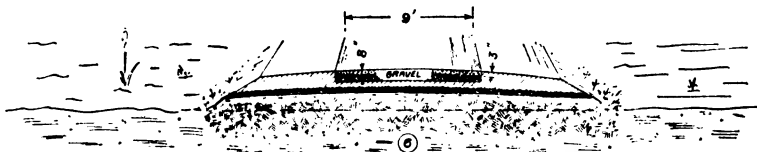
③ — GROSS-SECTION SHOWING STRAW AND BRUSH THOROUGHLY TRAMPED DOWN AND COVERED WITH TAR-PAPER —



④ — SUCCESSIVE COATS OF TAR SPRINKLED WITH GRAVEL ARE ADDED TO DEPTH OF 2 OR 3 INCHES, ROADWAY BEING MADE SLIGHTLY CROWNING, AND HEAVY WOVEN WIRE FENCING STRETCHED LENGTHWISE 3 LAYERS DEEP —



⑤ — ENDS OF FENCING ARE SECURED BETWEEN PLANKS, STRETCHED DOWN AND ANCHORED IN CONCRETE, 3 OR 4 INCHES MORE OF THE TAR AND GRAVEL ARE THEN ADDED —



⑥ — ABOUT A FOOT OF EARTH IS HAULED ON, SHOULDERS ARE FORMED, AND A REGULAR GRAVEL ROADWAY IS CONSTRUCTED ACCORDING TO STATE SPECIFICATIONS —

It is be necessary to make a fill it is generally cheaper to make it of earth which is just as good as stone for this purpose. It is an easy matter to find out about how much it will cost to fill up a bog hole. With pieces of gas pipe find how deep the fill must be, by running the pipe down until it strikes solid bottom. Then figure on a road bed twenty feet wide on top with side slopes of two to one, that is with a slant that will be two feet wider at the end of each foot going down. Earth sufficient to fill a space twenty-seven feet long, one foot deep and one foot wide is a fair load for a team. Then the number of loads to make the fill, and the cost of the whole can easily be determined.

BOG SWAMP REMEDY.

This remedy is suggested but not endorsed. It is handed out for whatever it may be worth.

The township, which invented it, tried it without any tar protection for the metal and reports that it has not sunken enough to notice.

Of course it would not answer for a long distance unless piles were driven down and mud sills laid on top of these piles across the road to support the driveway.

This plan is a combination of a floating and a suspension bridge. The amount of wire shown in illustration is altogether too little to support the road, but it will assist, and if the sod is not cut on the sides so the silt underneath can ooze, and the mat of brush and hay is laid wide enough and thick enough to form a raft for the road, the probability is, that good results will be obtained.

No brush should be laid having sticks over two inches in diameter, all of the twigs should be left on, enough brush should be laid to form a good strong bed. Then lay a covering of swamp hay, enough so a man can walk on it without his feet going through into the bog. Upon this, lay a covering of tar paper and on the tar paper slush tar, about half a gallon to each square yard. The tar will need to be hot but not hot enough to burn. Spread into this, gravel with no clay or earth in it, when it has hardened repeat the dose, then lay three thicknesses of common wire fencing as wide as you are to build your turnpike, spike the ends firmly to timbers in trenches at both ends of your bog, fill these trenches with concrete. When it has set put on two more coats of tar and gravel so as to thoroughly imbed your wire fencing in the tar concrete.

Put on about six inches of gravel and you have your suspension-floating bridge completed.

But don't build it unless your own common sense makes you believe it will answer your purpose. If you do build, kindly notify the state highway department how it worked.

— PLAN FOR BUILDING ROAD ACROSS BOG —

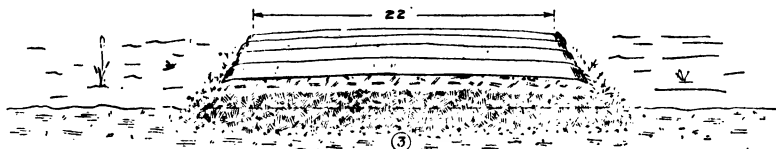
MICHIGAN
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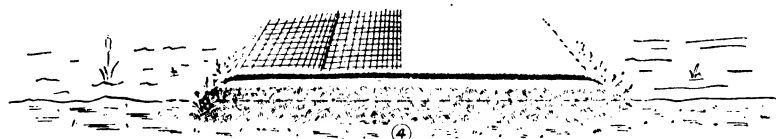
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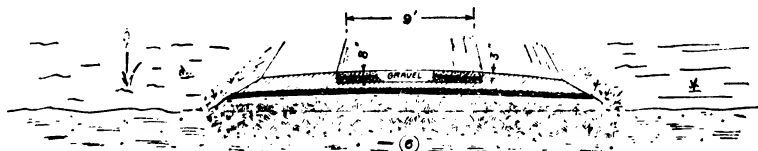
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⑥ — ABOUT A FOOT OF EARTH IS HAULED ON, SHOULDERS ARE FORMED, AND A REGULAR GRAVEL ROADWAY IS CONSTRUCTED ACCORDING TO STATE SPECIFICATIONS —

SODDING CUTS AND FILLS.

A good percentage of the cuts that have to be made in Michigan roads are through sand hills; generally where cuts are made, fills also are necessary, and these are made with the sand coming from the cuts.

No sooner are these cuts and fills finished than the sides of both begin to slide down, narrowing the road in both instances. Of course it doesn't make so much difference in the cut as it does on the fill, but even in the cut it is much better to hold the banks in place.

Sodding should not be attempted on sand banks in extremely hot weather, better do it in June or not until late in September, for the sods need rain to start the roots to growing.

OLD STATE ROADS.

Many complaints are made to us about the deplorable condition of some of the old state roads, built years ago and paid for with the funds obtained from the sale of state swamp lands.

These roads are now in the keeping of the townships in which they are located, and must be kept in repair by such townships, or not at all.

The present state highway department has nothing to do with them, unless they are rebuilt into first-class gravel or macadam roads under the state reward road law.

SETTLERS' ROADS.

This department is constantly receiving letters from settlers who have gone, either into the woods or upon some stump land, and have made for themselves a home. They have no road over which to haul their produce to market, or for their children to go to school. Some of the appeals are heartrending, but we can give them no help, only to write them that they should get seven freeholders to sign a petition addressed to the township highway commissioner, praying to have a new road opened up to them. Many times a second letter comes, telling that this has already been done, to no avail, because the highway commissioner says he has no funds.

If the arable state tax land of the state was turned over to the counties in which it is situated and a law was passed compelling the county to use the money obtained from the sale of it, in opening up new roads to the settlers, it would be but a few years before nearly every acre of good farming land in Michigan would be owned by real settlers, and the valuation of the land would change from one dollar an acre to twenty or forty or even a hundred dollars an acre.

It is a pity that the business of the state cannot be run along the

same plan as that of a private individual or corporation. If it were, Michigan would not sleep and allow settlers to pass through her domain bound for the west, without making an attempt to induce enough to stop off here to take up the good land that we have in plenty and to spare.

SHADE TREES.

(Extract from a paper read at meeting of Grand River Valley Horticultural Society, by James R. Wylie, Grand Rapids, Michigan.)

A township highway commissioner testified that acting on the suggestion of a resident of the town that some sixteen trees growing along the side of an avenue seventy feet wide, two of the trees in the middle of the avenue with the traveled roadway on either side and the others standing within ten feet of the fence along the avenue, "ought to be cut down, that they were not the thing to have in the street, that we were not living in the country where we have to make woods out of a highway and that they ought to be cut away"—did straightway proceed to sell the trees for \$16 to some woodman who cut them down and appropriated them to his own use. Naturally, the owner of the premises was dissatisfied. The more he thought about it and the oftener he inspected the stumps the more disturbed he became. In fact, he reached a state of mind that required action of some kind and, fortunately for us and other citizens of the state, instead of hunting up the commissioner or the wood chopper and slugging him, he adopted the orderly course of commencing suit for damages against both of them and so the controversy progressed through the courts until it reached the Supreme Court of Michigan and gave us in the clear terse words of Judge Cooley the law of this State bearing on such a state of facts, The title of the case is Clark vs. Dasso, 24th Michigan, at Page 85.

The commissioner undertook to justify his act under the statute, which authorized the Board of Highway Commissioners to remove shade and ornamental trees or shrubs whenever they obstructed the highway. Judge Cooley holds that the statute was no justification, for the reason that the commissioner did not act under it or in accordance therewith, but he says:

While we might leave this case here the danger that similar wrongs may be committed in other cases seems to justify further remark. The policy of our laws, as is clearly indicated by the statute, "favors the planting and preservation of shade trees in the public streets where they do not constitute actual obstructions." Undoubtedly there must be some officer clothed with authority to protect the highways against excessive planting or the improper location of trees and the commissioner of highways is a very suitable officer to be intrusted with this authority in the townships but where he is authorized to order the removal of shade trees it is a great mistake to assume that he may exercise his power in a wanton or reckless manner with impunity. Certain principles must always govern the action of these officers if they are to keep within the protection of the law. In the first place the policy of the law is to be considered, which would be wholly defeated if no one

had better protection for his shade trees than the whim or caprice of successive commissioners, any one of whom might destroy in an hour all that had been accomplished in many years. Then, again, it is to be remembered that the trees are the property of the adjacent owner, who can not wilfully be deprived of any species of property in the summary way which was adopted in this case. * * * The suggestion which set the commissioner in motion and led to the destruction of the trees came from a person who evidently had no sympathy with the purpose of the statute and who desired the trees cut down because of the very shade for which the statute encourages their planting and preservation. And why trees within ten feet of the margin of a seventy foot avenue should be cut down as obstructions is certainly not explained to our satisfaction on this record," etc.

This is the leading case in Michigan clearly setting forth and defining the rules and principles which govern both the public in its control of public highways and also that of the rights and interests of the adjoining owner in shade trees in the public highways.

WHAT OTHER STATES ARE DOING.

NEW YORK.

May 19th, 1908, the Hon. Charles E. Hughes, Governor of the State of New York, signed the new highway law. This law repeals all the statutes previously enacted on the subject of highways and creates a comprehensive and complete highway law, which has been very carefully drafted and considered by an able joint committee of the senate and assembly. This law was passed by a vote of 132 to 4 in the assembly and by the senate unanimously.

It provides for either county or district superintendents having charge of small areas. It provides a uniform fiscal year, with town superintendents to take office practically at the time that the new fiscal year commences. It preserves to the locality the regulation of the incurring of extraordinary expenditures, but it also provides for a more intelligent method of expenditure when the same has been duly authorized and also guarantees to the locality more certainty with reference to the annual repair of improved highways. It divides all highways into three classes—the state, county and town highways.

The state highways to be built by the department at state expense.

The county highways to be selected originally by the several county boards of supervisors, and when approved by the state department, to be built under the provisions found in this act, which were heretofore found in the Higbie-Armstrong good roads act.

Maintenance. Both the state and county highways will hereafter be in charge of a maintenance department whose sole business it is to maintain roads, the expense all to be paid by the state except an annual town charge of \$50 a mile to be spent for ordinary repairs in the town raising the money.

The town highways comprise all other roads, which are to be repaired

and maintained by the local authorities under the direction of the department and under the general superintendence of the county or district superintendent. Said work to be done on the money system and giving to each town the benefit of aid by the state in accordance with the general provisions of what has been commonly known as the Fuller-Plank law.

This new law provides for the laying out and building of 3,332 miles of state road to connect the large centers of population, thus forming a great system of through routes. About 500 miles of this system have already been constructed in small disjointed pieces.

These state roads when built it is hoped will be like the national roads of France. The law makes ample provision for their maintenance.

There is now unexpended and unpledged of the \$50,000,000 bond issue \$41,000,000. The law provides that one-half of this \$41,000,000, or rather of the part annually appropriated of this sum by the legislature, shall be devoted to the building of state highways and one-half to the building of county highways. There are therefore \$21,000,000 which will be applicable to paying for the cost of these roads, and as 500 miles of the 3,332 miles are already built, this sum is applicable to approximately 2,832 miles. This may not be enough money to complete the entire system, but it will go far towards its completion, and if it does not finish it, in years to come it will not be difficult to get more money for this purpose.

WHAT PENNSYLVANIA IS DOING.

BY R. D. BEMAN, DEPUTY STATE HIGHWAY COMMISSIONER.

Pennsylvania's awakening on the subject of good roads did not take place until the principle of state aid had been well established and in successful operation in a number of her sister states. It is true that there had been from time to time sporadic attempts on the part of many persons interested in the subject to devise ways and means by which better roads could be secured, but, as a rule, public interest was not at all aroused until after the passage of the first state aid bill by the legislative session of 1903.

In fact, there was so little interest in the matter that the bill above mentioned would have been defeated except for a personal appeal made to the legislature by Honorable Samuel W. Pennypacker, then governor of the commonwealth. Through his influence the bill popularly known as the Sproul law, (but which was in reality the joint product of State Senators William C. Sproul and Algernon B. Roberts) was passed. Under the provisions of this bill the state highway department of Pennsylvania was formally opened for business September 1st, 1903.

The 1903 act provided that the state should pay two-thirds of the cost of road reconstruction, the remaining third to be borne equally by the county and township in which the road was located. The act carried with it an appropriation of six million, five hundred thousand

dollars, the expenditure of which was to be distributed throughout a period of six years; a half million dollars being available during each of the first two years, a million and a quarter dollars during each of the next two years, and a million and a half dollars during each of the last two years of the six. In 1907 an additional appropriation of one million dollars was made. The passage of the act of 1903 was fought bitterly on political grounds, and the existence of the department has ever since been the object of quite determined attack on the part of those who have from the beginning arrayed themselves in opposition to the general cause of road improvement. No longer able to stem the public sentiment which has developed with wonderful rapidity, the attacks on the cause of road improvement have recently been shifted into attacks upon the department and its methods. Some of the defects which experience showed to exist in the original law have been corrected by the legislative sessions of 1905 and 1907, and it is worthy of note that the apathy which was encountered in the original road measure as introduced in 1903 had largely, if not entirely, disappeared at the session of 1907. The department was early handicapped by an insufficient force of employes, this defect only having been partially corrected in 1905 and, at last, brought upon a proper basis in 1907. In the early days of the department it was also found difficult to obtain competent help, as there had been so little interest taken in scientific road building in Pennsylvania that there were few persons in the entire state who possessed the requisite knowledge to enable them to carry on such work successfully. When it is remembered that Pennsylvania has about one hundred thousand miles of public roads, distributed throughout nearly sixteen hundred townships contained in sixty-six counties, it can be seen that the new department was confronted by no mean obstacles. The progress which has been made is exceedingly gratifying to the friends of the cause whose judgment has been justified by the results which have been obtained.

The first roads built by the department were constructed in 1904 and with the cessation of work at the close of the season of 1907 about four hundred miles of stone roads had been completed. Applications for state aid, which, during the first few months of the department's existence came in very slowly, have now reached an aggregate of thirty-three hundred miles, requiring the expenditure of four or five times the amounts thus far made available for this purpose by the legislature. If the future may be correctly judged from the past it is plainly evident that the passage of a few years will find Pennsylvania in the forefront in the improvement of her public roads. The road cause is at the present time one of those most prominently before the minds of the people of the state and, while there is, of course, some opposition still found, it has lost its force.

The roads built by the department are as a rule of the ordinary macadam type, or a combination macadam-telford. The department has constructed a few sections of road on which brick have been laid where exceptional circumstances seemed to demand a different form of construction than that ordinarily followed. No gravel roads have been built because of the fact that there is practically no gravel suitable for the purpose in the state. The department has been consider-

ably handicapped by the scarcity of suitable stone and has devoted much time and effort to an investigation of road materials found throughout the state. Pennsylvania abounds in stone, yet the most of it is unfit for road-building purposes. The bridges and culverts built by the department are of the most permanent type, reinforced concrete being used in a great majority of cases. No wood is under any circumstances used either in constructing small drains or the floors of the larger bridges, the effort being to produce a class of structures which will not require repairs. The roads as a rule have stone placed upon them to a width of sixteen feet.

The awakening in public sentiment which has been largely brought about by the adoption of the state aid plan in Pennsylvania, has also caused determined efforts to revise the laws under which the various townships have carried on their road affairs throughout the greater part of the state. The so-called work or labor system has been in effect from the days of the earliest settlers. There seems now to be little doubt that the next legislature will pass an act which will abolish the work system and make compulsory the payment of all road taxes, in cash. Such an act was in fact passed by the last session, but the bill unfortunately contained other provisions which induced the governor to veto the measure. The roads built by the department have also served as object lessons, so that the effects produced have been much more far reaching than can be adequately described in any mere statistical report. Taken all in all, the awakening of sentiment, growth in interest, and accomplishments since the passage of the original act of 1903 form one of the brightest pages in the history of road improvement in America.

STATE REWARD ROAD LAW IN BRAZIL.

Consul-General George E. Anderson, of Rio de Janeiro, advises that in line with the policy of the federal government and the several state governments in Brazil to push the construction of railways in the several portions of the country there is also to be noted the encouragement of every other means of communication, among them the construction of good roads. The consul-general states further:

With the construction of good roads goes the encouragement of the establishing of automobile services to supplement or take the place of railroad service. The annual budget law of the federal government in Brazil provides that the president of the republic is authorized:

To grant a subsidy at the rate of 4,000 milreis (milreis=30 cents) per kilometer (0.62 mile) to companies or to private individuals who build roads and organize a service of automobiles for the carrying of passengers or merchandise when such roads link up two states or traverse only one. The same subsidy shall be granted to states or municipalities who organize the same service, and in both cases the following conditions shall be observed:

(1) The roads shall be built in accordance with technical regulations which shall be issued for this service and must serve one or more

locality or localities of economic or administrative importance in accordance with the decision of the federal government when built by companies or private individuals.

(2) The subsidy shall only be paid when the Government inspector (who shall be paid by the interested parties by means of half-yearly deposits in the Federal treasury) declares that the road or sections of roads which have been completed are in accordance with the aforesaid technical regulations.

(3) The subsidy shall only be paid when the roads are completed from start to finish or when at least 120 kilometers have been completed in accordance with the aforesaid technical regulations.

(4) Zone privileges shall not be included among the favors granted these automobile lines. The concessionaires shall only have the right of using and the exclusive enjoyment of the roads which they have built and the land which is indispensable for the up-keep of the same.

The plan of communication thus outlined in the law refers particularly to a number of schemes in different portions of the country, notably in Rio Grande do Sul and in the north of Minas Geraes. The subsidy amounts to about \$1,200 per mile. As representing the cost of the improved highways the importance of this sum applies chiefly to great stretches of country where little work upon practical roads would be required.

PRACTICAL RESULTS—EXCELLENT OLD HIGHWAYS.

Assuming that a freight and passenger service of automobiles over thinly-settled country will be practicable and economical, it is estimated here that the proposed aid of the Government will be sufficient to guarantee a reasonable profit upon the undertaking. The proposed regulations provide for the reversion of the new roads to the Government at the end of certain periods.

It is a notable fact that all over Brazil there are public enterprises for the construction of improved roads or the improvement of old roads as a necessary adjunct to agricultural and other development of the country. It should be added that in its earlier days Brazil possessed some of the finest roadways in the world, the old Government highways before the day of railways comparing favorably with the best government highways of Europe of the same period. Railway development in Brazil is of comparatively recent date, and some statesmen and publicists of the country regard transportation and communication by highways as not only more practical than it is regarded in the United States, but, in a way at least, as the more natural means, even covering long distances as they exist in Brazil.

Several automobile roads are in the course of construction in Rio Grande do Sul and elsewhere under the direction and control of the several State governments, and it is probable the subsidy offered by the Federal Government of Brazil will first be awarded in connection with such State enterprises.



State reward gravel road in Grand Rapids township, Kent county. Built by the Grand Rapids good roads district.



State reward gravel road south of Scottville in Mason county. Built by county road commission.

ROAD KINKS.

SUGGESTIONS MADE BY

TOWNSHIP HIGHWAY COMMISSIONERS.

SUGGESTIONS MADE BY TOWNSHIP HIGHWAY COMMISSIONERS.

Township board should have power to raise additional tax where the electors do not vote a sufficient amount.

Leave amount of tax to be raised with the township board as board is responsible to voters for the tax rate.

That section of the law which makes the decision of the town board final when appealed to by an individual, should be made so that the said board could not decide against a petition signed by a majority of the legal voters of the township.

Make poll tax optional with township.

Wages of commissioner and overseer should be fixed by law.

Number of hours constituting days labor should be fixed by law.

Extend the term of office of highway commissioners.

Highway commissioners should have more power to establish drains.

Amend penalty clauses to provide for imprisonment as well as fine.

Force property owners to take care of weeds and brush.

Have all roads surveyed by county surveyor and let the county pay for same.

Tax automobiles commensurate with damage done by them.

No farm tools that will injure road bed should be hauled on it.

Pass a law that will compel threshers running heavy engines on highways to carry plank to lay on bridges in crossing, for a little precaution would save a township many dollars.

Township should own gravel pits.

Have a regulation size of gravel box required for a load.

Have a law compelling owners of gravel pits to sell gravel or pits.

Regulate price of gravel.

State should furnish stone and gravel at actual cost.

The state should own stone quarries and operate them either by convict labor or hired help. Create if possible uniform rates for every county or township.

Every highway commissioner should have a good township map showing all the roads, also all the rivers, creeks, bridges, culverts and watering troughs.

A law should be enforced to have all the section and quarter corners re-established before they all get destroyed. I know there are hundreds of them destroyed each year.

There should be a law prohibiting the moving of engines, separators and clover hullers over the highways late in the fall.

Think there should be a law forbidding the hauling of heavy loads right after a rain of five or six days, for a period of three or four days.

Wide tires on all wagons.

If the speed of automobiles was lowered, it would be a good thing for the roads. Every one that goes through the town throws more dirt than man can shovel in a day.

Compel the use of four inch tires on Standard oil wagons as they are now using narrow tires for carrying sixty-five to seventy hundred and are doing much damage. Also make it applicable to all vehicles carrying forty hundred or over.

Township should own one or more teams for highway work.

Take down stump and rail fences along the highway and prevent snow blockades.

Brush must be cut so as to prevent snow drifting.

Road machinery should be repainted every two years.

Highway commissioner should have list and keep a record of all tools owned by township.

Townships should be compelled to build tool sheds for storing tools and machinery.

Pay good wages to men employed and then you feel like hustling them for all they can possibly do.

Make paths on side of road for children to walk on.

Some kind of a machine that would operate with team to make ditch could be a great benefit to the highway.

All townships should bond to the full limit, if necessary, and pay for their roads later. Do not spend a few dollars each year for patching roads that were never built properly in the first place for lack of funds.

All road work should be done early.

Clay roads should not be graded after July.

Fall plow where grading is to be done in spring so sods will rot.

Use road drag after every rain, especially on clay.

Have one drag to every ten miles of road.

Furnish material for building road drags to every farmer who will build one and use it.

Present law reads such that persons having fences in highway cannot be compelled to move them between April 1st and November 1st. The commissioner comes in power about the first of April, and as a consequence is handicapped in improving road at such places for that year.

The highway commissioner cannot compel a person to move his fence off the highway from the first day of April until the first day of November. Now with the ground frozen about seven months out of twelve how can they be moved? This limit should be taken off.

Fruit trees should be planted along the highways in localities adapted for fruit.

Give the commissioner the right to let any part of the highway outside the road bed to any party who will plant and till for one season provided the owner of adjoining land will not agree to do so, for a potato crop will put it in fine shape for grading.

Roads should be kept open in the winter by the people along the route, free of charge. They will gladly do it in order to get their mail,

otherwise it will cost as much some winters as it will to do the road work in the summer, without any benefit to the road.

There is as much difference in building roads as there is in farming, you have to farm according to the soil.

It would be a great benefit to every township if a member of the township board would attend the annual meeting of commissioners and all commissioners accustomed to the work should be re-elected.

Cut down the hills.

Grading should be done early so the roads will be packed before the fall rains.

Shallow plowing, from three to four inches, is best.

Use road grader for opening up new roads.

Be sure the road is graded and drained properly before putting on gravel.

A certain portion of money should be used each year for gravel and used for gravel only.

The cheapest way to build swamp roads is to brush it in the summer and if very soft, haul the dirt in on the snow.

A good way to deal with shoveling snow would be to pay a per cent of what balance there is in the highway repair fund at time of settlement with township board.

No commissioner should have a right to put in a crossway of logs or any rough stuff that will come up by freezing and cause the work to be done over next year.

Build bridges by special tax.

Use more concrete for bridges.

County should build big bridges.

Concrete culverts are the only kind to build.

The trouble with most of the commissioners is they put in too small a culvert.

Where most township commissioners miss it, they don't get their foundation down deep enough, then the muskrats undermine them and the spring floods carry the bridge out.

In building a box culvert the whole foundation should be built in one solid wall and put in a cross wall so there will be no chance for water to get under the foundation.

New way of forming arch to lay culvert. Lay poles lengthwise, cover with straw and marsh hay, then cover with sand or clay and when concrete is dry remove.

In putting in new bridges do not get them too short to allow space for the water to pass through, for if you do your grade will wash out. If you put in a new grade have it wide enough on the bottom so that if you ever have to raise it any higher you can do so without filling up the old ditch to get the proper width on top.

In making concrete floors for bridges, what would be the least thickness the floors should be made so as to be safe, using no extra concrete? Which is the stronger, to put part of floor down between the beams, or put it all on top?

(The floor should be the thickness of the I-beams with two inches additional over the top. It is stronger to put the concrete between the beams with two inches on the top, for in that way you brace your

*ams if they are properly tied together, when if the floor were put
ly on top the rack to the side would be a great deal harder.—Com.)*

We have a limestone quarry in our township, so we use what they
all flagging for bridge covering, in the place of plank, which is ever-
lasting.

In putting in small bridges of less than ten feet, in a soft place, I
could sink a platform of planks across the stream about three feet
wider than the width of the outside of the arch. That gives room to
place stone for sinking the planks. If there is running water, make
a box the size you want the outside of your arch and put about six
to eight inches of concrete on top of plank, then you have a solid
foundation for your arch. Of course your plank are to cover the whole
of the bottom of the arch. We built one this way and it stands all
right.

A large portion of commissioners build arches where small culverts
are needed and where the turnpike is not very high. I think they ought
to go out of date. In most cases you have to cover them every year,
and it takes a mason to build them, where a flat top of concrete will
give more satisfaction. A man with any gumption at all can build one
and it gives you more throat for the water. The mason labor at three
dollars a day will balance the difference in the extra concrete that it
will take.

One thing we did this year is that in the place of a steel bridge
or stone culvert, we took two four-foot concrete culvert tile, twenty
feet long, placed them side by side and stoned up the ends.

We have a great many drains in our township and it was too level
for arch culverts, so I put in cement sides, 6x6-inch I-beams, 2x8-inch
inside channel rails. I bridged up under them with plank and filled
the top with cement, and put one 16-foot, three-fourths-inch rod across
the middle and a heavy woven wire on top, then put on three inches of
cement, in all 9 inches of cement. The cost was \$100 dollars each.
They have stood the test and the township board is well pleased with
them.

I think we have solved the culvert question in our town. We made
molds for different sizes of blocks for sides and top, the top ones rein-
forced with iron rods. It is only necessary to have the mold for the
sides and lay them on any flat surface (the ground for instance) and
pump the grout into the molds, smooth the top and remove molds.

I have been making my culverts over a wooden frame which I can
move. I put a cement bottom in all culverts and when completed they
are one solid piece. I build all culverts twenty feet long or more on
an run in highway.

I have built a forty-foot concrete wall six feet high to protect the
road bed from being washed away by a swift running creek.

As I had a quicksand bottom of seven feet under my bridge I drove
piles and cut them off below the water, and built cement abutments on
them.

I am satisfied that I can buy bridges of equal value at less cost at
private purchase than I can to advertise for bids. When we advertise
for bids the agents get together and put up the price and divide the
profits. We had to reject all bids before we could buy satisfactorily.

At a meeting of the highway commissioners held at Muskegon the fall of 1906, the matter was discussed in regard to laying tile on quick sand. The convention thought it could not be done, but I have tried it in this way and it has proven satisfactory. First changed course of water to one side of natural bed, cleaned out natural bed one and one-half feet deep and filled in with evergreen brush, (hemlock I found best), laid tile on the brush, then filled in with dirt from bank, tamped good on under side of tile, put in two foot tile (diameter). Fill was forty feet wide and nine feet high. This work was done three years ago and is as level as when first built.

Mr. Earle said in order to make a good road the first thing to do was to drain the road, the second was to drain the road and the third thing to do was to drain the road, and we drained one mile of swamp road and found it worked like a charm.

Had experience with a swamp this year, had to take out the cross-way and as it was so full of mire, cut green brush and put in the road-bed crosswise, then dug the ditches, put the muck on the brush, hauled dirt on top of the muck and it held up under heavy loads.

Built eighty rods of road through a cedar swamp of six to eight feet of muck. Filled this swamp with brush and threw in lots of old mossy bogs in the bottom. Find marsh hay is the best if it can be had.

One high hill had a large spot of quick sand which was so bad that wagons would sink quite deep in the driest time. This year I put tile three feet down, across the road and down the hill and now we have a dry hill.

In digging a ditch through a marsh it should be dug the full legal width of road from the center. This answers two purposes: First as a fence; second, it will draw the water from the center of the road and help to make a solid road each year nearer the ditch. Again I find by experience that a narrow road built through a marsh causes much trouble, because in haying and harvesting sometimes it causes much disturbance as to right of way. All roads should be built for future generations to enjoy the good results of our labor done by us and left as a monument to mark the good of our labor in the years that we lived.

I have made the following plans in case of snow this winter. I mapped out the township and divided it into eighteen divisions and in each division I appointed a reliable man with a good team and furnished him with a good snow plow. (Each plow is on runners six inches high to leave snow enough for good sleighing.) I then called a meeting of these overseers at the town hall and gave them a map of their divisions with written instructions.

We have plenty of gravel and I think it would be a good plan to sift and grade it. It would be a very good idea for the township to buy a machine for that purpose.

Built the screening device found on page 133 of the first biennial report of the state highway commissioner. We screened one yard of gravel in six minutes and could average a load every ten minutes. Would say we found that it was necessary to have slideways twelve feet highway instead of eight as suggested, in order to set our wagon under a forty-five degree angle screen. The screen mentioned was a failure as fine gravel would stick and clog in same. We used a $\frac{1}{4}$ inch wire cloth

screen, but had to renew it every four to six days. Later got a perforated screen, $\frac{3}{8}$ inch, which we would recommend for durability. I put a trap door to stop gravel from running over screen too fast at top of screen, it took a boy to handle same, but worked enough more satisfactorily to pay extra expense. The device in right-sized gravel certainly would be a success, our gravel runs too large. We caught all waste gravel and sand in another wagon by means of placing boards under our screen.

I think the roads in my township could be kept in much better repair if traction engines were not allowed to haul separator, tank wagon and repair wagon without the aid of a team.

A single engine would not tear up the road so much but when they put a heavy separator on behind they tear up the roads, dig holes, put in old rails and then go on and leave them all in the road.

I have been called twice to repair a piece of road that was cut up in bad shape by engine passing over them hauling separator without horses attached.

Make it a fineable offense for the driver of a traction engine to fail to use plank in running over a bridge and again putting them in their proper place when furnished and put there for that purpose by the commissioner.

I have used an engine on the grader this year instead of horses and find that I can get a great deal more work done than I did one year ago when I used the horses. If I were going to do any more work I would hire an engine in preference to horses, for if the weather is warm you can go along just the same as if it were cold and do not have to wait to have the horses cool off.

I kept the same men right through on the bridges, and hired a cook, had a tent to cook and eat in and a tent to sleep in, besides a small tent for tools and cement. Kept two steady teams with me and hired the rest as I could get them. It cost about forty-one cents per day to board a man, including paying the cook. All the men did not stay nights so this is not exact. I think this is a very good way to do where there are so many bridges to build, as I built seven besides the repair work.

I think all townships should build two miles of gravel road each year and receive state reward as it would not cost the township but a small sum each year if they would plan a year ahead. They could grade the year previous to graveling and have it ready for the gravel.

When I work I plan to improve two miles of road so there will be no grading when they apply for reward and in so doing the township does not have to pay a lot of money to get ready to gravel. I have built one mile and three fourths and it did not cost the township one dollar, only the road work in the district, the road being graveled by the state reward.

I would suggest that the state build new roads, especially in northern Michigan with convict labor. We need a great many roads that we are not able to build, and no roads or bad roads keep this part of the state from being settled.

In opening a new road I first set a row of stakes in the center of right of way, then measure twenty-five feet, and set a row of stakes for ditch. The dirt from the ditch grades the road, and you have your road built.

This I find is the fastest way and wastes less money than any other way I know of to open new roads where there is but little money to spend.

I think from actual experience that if the department could have the power to pay reward for each mile of new road built it would be a great benefit to the state, for the new settler needs the roads more than the old settler, as the man in the woods has to haul his timber and food over the road at all times where the old farmer or city man has it right at hand. If a small reward was given, every township would get busy and open up new roads and the wild land would soon be all taken up, for the settlers would then be sure of having a road.

I think it is a good plan to use wheel scrapers to draw the dirt from the side of the track on the hills and dump it on the track in the hollow below as it will make a very good road. The dirt on all the hills I have done in that way has been as good as any dirt we can get, unless we draw it from one to three miles.

We had a piece of mucky road, and gravel was not handy, so I put a foot of sand on it. It mixed with that black muck, and is today as fine a piece of road as any dirt road can be. Too much clay is worse than none.

After repairing roads in spring I graded two miles, it was a very sandy road and underlying the sand was a clay subsoil which we graded over the sand, making as hard a road bed as I ever saw, width of grade thirty-three feet from side to side.

As we had some very deep sand in places in the road and clay or gravel is hard to get, and there being an ashery close by, I used leached ashes on some of these places, mixing in a little sand and the road is as hard as a brick. There was a piece of road built seven years ago in the same manner and is still a fine piece of road.

We are making some pieces of roads with limestone chips brought from a lime kiln in our township. We get the refuse from the quarry for twenty-five cents per load of one and one-half yards, three loads make two rods of good road and seems to give good satisfaction. The clay in it seems to mix just right to make it hard in dry weather. Is not as dusty as all stone and will hold up four tons of sugar beets in wet weather.

I find that brick bats make a very good road when rolled with a heavy roller.

I have built about one and one-half miles of road of clay and coarse sand from a copper stamp mill. I built one-half mile of this road as an experiment last year and found that it was even better than a gravel road. I built the road by first using a bed of clay and then covering the same with about five or six inches of coarse stamp sand. After this becomes mixed with the clay it makes a road hard and smooth, the surface of which will stand the hardest rain storms without showing signs of being washed away. The cost to us was about \$75 more per mile than the cost of gravel roads.

I put in three cement water troughs, one on each main road leading to town, and I believe people appreciate them more than twice the amount of the cost. The cement cost \$3.30, mason \$1.75, and the pipe depends upon how far the water has to be carried. The three cost about \$7 each, and they are certainly a nice improvement.

My overseer carried a day book and every evening put down the time for every man and team, their work and wages. By this system we know what every thing cost us. Every two weeks our overseer would make out a statement of the men, teams and time and give it to me and I would draw the money, according to the statement.

Now, my advice where a township has a town, city or village, is to commence at the town and work out into the country, not begin out and work in as has been done for years. We all know that the horse can haul a load the first mile or two but at this he becomes leg weary, if he can get on a good hard road the rest of the way in town, (for that is where the most of our loads are drawn) he is all the better for it. Make all the main roads leading in your city good, for the better the road the more the farmers are worth.

NATIONAL REWARD FOR ROADS.

Government by all for all. All share in the expense of maintaining a government, and that government which gives to all, the most benefits, with the cost most equitably divided is the best government.

I appreciate most, of the benefits given me by the national and state governments:

First, The privilege to worship the God in whom I believe, in the way that I believe I should, a way which gives me the most comfort here and which I am satisfied will insure that my soul will live in peace and happiness hereafter.

Second, The advantages of education, that I may enjoy life more fully, that I may learn to love and appreciate my fellowman and at least one fellowwoman.

Third, A postal service which makes it possible for me to communicate with my kin and friends no matter in what nook or corner of this earth they may happen to be.

Fourth, The roads and streets, the railroads and boat lines that make it possible for me to visit my friends, and for them to come to me, for me to ship my manufactures anywhere in the world and to have shipped to me what I need and want.

Now, the better the service the better the government.

The privileges of our government so far as religion are concerned are equal to any nation on earth, and superior to the most.

Our educational advantages are far ahead of any other country.

Our postal service is fair, but not equal to that of a few nations. However we are taking steps every day to improve it, and have made wondrous progress in the past ten years.

Our methods of transportation,—take the railroads, they are the best in the world. They ought to be, we've done enough to make them good, first built them and then gave them away and paid the takers large sums of money every year to keep them. Our boat lines in the interior are also superior to those of any other nation, our coastwise lines are equal to any, and our international are going to be, right, for sooner or later they will certainly be subsidized, which is what we want it



1. Definition of the problem
 2. Statement of the objectives
 3. Formulation of the hypotheses
 4. Design of the study
 5. Collection of data
 6. Analysis of data
 7. Interpretation of results
 8. Conclusion
 9. Recommendations
 10. References
 11. Appendices
 12. Tables
 13. Figures
 14. Summary
 15. Abstract
 16. Introduction
 17. Background
 18. Methods
 19. Results
 20. Discussion
 21. Conclusion
 22. References
 23. Appendices
 24. Tables
 25. Figures
 26. Summary
 27. Abstract
 28. Introduction
 29. Background
 30. Methods
 31. Results
 32. Discussion
 33. Conclusion
 34. References
 35. Appendices
 36. Tables
 37. Figures
 38. Summary
 39. Abstract
 40. Introduction
 41. Background
 42. Methods
 43. Results
 44. Discussion
 45. Conclusion
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 49. Figures
 50. Summary
 51. Abstract
 52. Introduction
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 54. Methods
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 67. Results
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 127. Results
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 129. Conclusion
 130. References
 131. Appendices
 132. Tables
 133. Figures
 134. Summary
 135. Abstract
 136. Introduction
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 146. Summary
 147. Abstract
 148. Introduction
 149. Background
 150. Methods
 151. Results
 152. Discussion
 153. Conclusion
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 155. Appendices
 156. Tables
 157. Figures
 158. Summary
 159. Abstract
 160. Introduction
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 162. Methods
 163. Results
 164. Discussion
 165. Conclusion
 166. References
 167. Appendices
 168. Tables
 169. Figures
 170. Summary
 171. Abstract
 172. Introduction
 173. Background
 174. Methods
 175. Results
 176. Discussion
 177. Conclusion
 178. References
 179. Appendices
 180. Tables
 181. Figures
 182. Summary
 183. Abstract
 184. Introduction
 185. Background
 186. Methods
 187. Results
 188. Discussion
 189. Conclusion
 190. References
 191. Appendices
 192. Tables
 193. Figures
 194. Summary
 195. Abstract
 196. Introduction
 197. Background
 198. Methods
 199. Results
 200. Discussion
 201. Conclusion
 202. References
 203. Appendices
 204. Tables
 205. Figures
 206. Summary
 207. Abstract
 208. Introduction
 209. Background
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 211. Results
 212. Discussion
 213. Conclusion
 214. References
 215. Appendices
 216. Tables
 217. Figures
 218. Summary
 219. Abstract
 220. Introduction
 221. Background
 222. Methods
 223. Results
 224. Discussion
 225. Conclusion
 226. References
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 232. Introduction
 233. Background
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 235. Results
 236. Discussion
 237. Conclusion
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 242. Summary
 243. Abstract
 244. Introduction
 245. Background
 246. Methods
 247. Results
 248. Discussion
 249. Conclusion
 250. References
 251. Appendices
 252. Tables
 253. Figures
 254. Summary
 255. Abstract
 256. Introduction
 257. Background
 258. Methods
 259.

costs to put these lines into first-class shape, will be paid by the taxpayers of the United States.

But our common, every-day wagon roads, they are by all odds the poorest on the face of this green earth, no other civilized nation on the earth but has better than we. Why is it? Is it because we are poor? A people that has created and builded a nation in a day, with more millionaires than any other two countries can claim, poor? Well, hardly. The trouble is that we are so rich that we can live even with poor roads. It would bankrupt a commonly blessed nation to haul the products of field and factory over such abominable roads.

What are we going to do about it? Knowing, as we do, that the nation has paid out in land and money to railroads and rivers and harbors, two billions of dollars, or one thousand dollars per mile for every one of the two million miles of public wagon road there is in this home land of ours, isn't it about time that we insisted upon having some national aid on our highways, that the roads of our country may show signs of civilization; may show that our religion has taken effect and that we are putting our education to a good use, benefitting our postal facilities and making it easy for us to get to the church, to school, to library, lodge, theatre, to market, and last but far from least, to our neighbor's dinner table and sitting room. This can be brought about all over the United States only by national assistance, no other country ever got good roads in any other way, then why should there be longer delay in following the precedent established by all the nations that have good roads. I am one of a very large majority of the people of this country that demand national help, and I have drawn a national reward road bill on the plan of the Michigan state reward road law, as follows:

NATIONAL REWARD ROAD BILL.

DRAWN BY HORATIO S. EARLE, STATE HIGHWAY COMMISSIONER.

A Bill to establish in the Department of Agriculture a bureau to be known as the United States Highway Department, and to provide for national reward for the improvement of the public wagon roads.

Be it enacted by the Senate and House of Representatives of the United States of America in congress assembled:

Sec. 1. That there shall be established in the Department of Agriculture a bureau to be known as the United States Highway Department.

Sec. 2. That the object and purpose of said Department shall be to assist in and encourage the improving of the public wagon roads in the various States and Territories of the United States by the payment of national reward, according to the provisions of this act; to make investigations, experiments and tests in regard to methods of road making and road materials; to furnish without charge to any State or Territory, the result of any such investigation, experiment or test, upon request of the State or Territorial Highway Commissioner, State

ngineer, or other officer or officers having in charge the question of improving the public wagon roads of such State or Territory; to give advice, information and reports on the subject of roads, road improvement, road material, and so forth, by means of lectures, bulletins or otherwise; to suggest from time to time laws which, if enacted, would tend to bring about, as far as may be, a uniform system for the construction, repair and improvement of the public wagon roads throughout the United States.

Sec. 3. That an officer to be known as the United States Highway Commissioner shall be appointed by the President, by and with the advice and consent of the Senate, within fifteen days after this act shall take effect. Such Commissioner shall be a citizen of the United States, and shall have practical knowledge of road construction, improvement and repair. He shall receive a salary of eight thousand dollars per annum, and shall hold his office until the first day of July, nineteen hundred thirteen and until his successor shall be appointed and qualified. The term of office, after the said first day of July, nineteen hundred thirteen, shall be six years. The said Highway Commissioner shall have his office at the seat of government, and shall personally superintend the duties of said office. He shall appoint, subject to the approval of the Secretary of Agriculture, a Deputy Highway Commissioner whose duties shall be to assist the Commissioner, and in his absence to act in the place of such Commissioner. Said Deputy shall receive a salary of five thousand dollars per annum. Such other officers, inspectors and employes as may be required to carry into effect the provisions of this act shall be appointed by the said Commissioner: provided, That the said Department shall be under the general supervision of the Secretary of Agriculture, who shall exercise general jurisdiction over all matters and acts coming under its control by virtue of its enactment.

Sec. 4. That the Bureau of Public Roads is hereby abolished and all reports, and information, machinery, office supplies, files and all other matter of whatever name or nature, belonging to such Bureau of Public Roads, shall be placed in the charge of and under the control of the said United States Highway Commissioner.

Sec. 5. That the United States Highway Commissioner shall make and promulgate all needful rules and regulations under which the various States and Territories may apply for and receive the benefits of this Act, which said rules and regulations shall be approved by the Secretary of Agriculture.

Sec. 6. That whenever any State or Territory shall file notice with the United States Highway Commissioner through the officer or officers having in charge the matter of improving or aiding in the improving of the public wagon roads of such State or Territory, or the officers of any two or more States or Territories shall do so jointly, stating that it is the intention of the State or States, Territory or Territories, to build a certain number of miles of road such as will merit United States reward, it shall be the duty of the United States Highway Commissioner to furnish general plans and specifications, which, if followed, will entitle the State or Territory to receive the amount of reward due for the length and class of road built.

Sec. 7. That every mile of well graded road on which the steepest incline shall not exceed six per centum and the width of which shall not be less than eighteen feet between side ditches, and which shall be properly drained, and crowned so as to shed water quickly to the side ditches, and which shall have a wagon way or travel track not less than twelve feet wide, made in two courses and thoroughly compacted; if built in accordance with the plans and specifications of the United States Highway Commissioner, and approved by him, shall merit reward as follows: If built of gravel, five hundred dollars per mile; if built with one course of approved stone and one course of gravel, seven hundred fifty dollars per mile; if macadamized, one thousand dollars per mile. If the United States Highway Commissioner shall by investigation or experiment, find that some other material than those mentioned in this section is equal to them or any one of them, then he may prepare plans and specifications for roads to be built of such material, and shall place them in one of the classes described in this section, and such roads shall be entitled to receive the reward of the class to which they are assigned by the said Commissioner.

Sec. 8. That the decision of the United States Highway Commissioner shall be final relative to whether the road is built well enough to merit United States reward, or not.

Sec. 9. That no claim for United States reward for improved roads shall be made by any one State or Territory in any one year, in excess of five per centum of the total mileage of public wagon roads outside of incorporated villages and cities, and all public wagon roads within the meaning of this Act shall be leading public wagon roads, outside of incorporated villages and cities.

Sec. 10. That the United States Highway Commissioner is hereby given the authority to refuse to grant any further reward to any State or Territory that has been rewarded by the United States for improving roads, that does not keep these rewarded roads in proper repair, but his refusal shall be accompanied by a statement to such State or Territory of what repairs are necessary to place such State or Territory in a position to again be eligible to receive United States reward, and if these repairs are made satisfactorily to the Commissioner, he shall reinstate such State or Territory to the eligible reward list.

Sec. 11. That at the request of the United States Highway Commissioner every State or Territorial Highway Commissioner, or State Engineer, or other officer or officers having in charge the question of improving the public wagon roads of such State or Territory, shall make to the United States Highway Commissioner a report on or before the thirty-first day of December each year, answering such questions as the United States Highway Commissioner shall deem proper to ask and they be able to answer, giving him such information as he may require and their ability permit, appertaining to roads, methods of construction, material, machinery, costs and so forth, upon blanks which he may furnish and send out.

Sec. 12. That if any State or Territorial Highway Commissioner or State Engineer or other officer or officers mentioned in section eleven of this Act, shall refuse or neglect to make such report at time stated or within a reasonable time thereafter, or shall fail to give reasons satisfactory to the United States Highway Commissioner why such report cannot

made, it shall be the duty of the United States Highway Commissioner to declare such State or Territory ineligible to any United States reward for roads, and he shall notify such officer or officers of such ineligibility, and he may refuse to pay any reward to such State or Territory until such time as the officer or officers of such State or Territory shall make such report or shall give satisfactory reasons for not doing so. The United States Highway Commissioner may, in his discretion, refuse to pay any United States reward on any roads built during the time such State or Territory was declared ineligible.

Sec. 13. That this Act gives no authority to pay any reward for any improvements made in public wagon roads, prior to the passage of this Act.

Sec. 14. That there is hereby appropriated, out of any moneys in the treasury and not otherwise appropriated, for the purpose of carrying out the provisions of this Act, the sum of one hundred millions of dollars, the said appropriation to be available at the rate of ten millions of dollars a year, beginning with the year in which this Act shall take effect. If any portion of the ten millions of dollars appropriated for any one year shall not be expended in the year for which it is appropriated, such portion not expended shall be added to the ten millions of dollars available in the year following.

Sec. 15. That all acts and parts of acts contravening the provisions of this Act are hereby repealed.

If you are in favor of the passage of the above bill write and tell our representative and senator in Congress. Copies of the bill will be furnished by Horatio S. Earle, State Highway Commissioner, Lansing, when requested.

LETTER WRITTEN BY HIGHWAY COMMISSIONER EARLE TO
A CONGRESSMAN, IN REGARD TO A BILL INTRODUCED IN CONGRESS.

December 27, 1907.

My Dear Sir—I beg to acknowledge receipt of the copy of your bill No. 10501, also a note asking me my opinion of it.

Please understand me, I am a believer in government aid for roads built good enough to merit it, but I am opposed to any plan whereby the United States government will have anything to do with the actual building of them.

I favor the helping of the shipping interests by the government so that our wares and mail may be carried in ships sailing under the United States flag, but I am not in favor of the nation going into the merchant marine business. Why? Because the government cannot, and would not if it could, handle such matters as shipping and road-

building anywhere nearly so economically as individuals and corporations can and would do, for politicians, you know, have a lot of proteges which must be taken care of, and so they are "jobbed out" on the government. Nothing personal in this, you understand, but on the whole isn't it the truth?

Further, under your plan the government goes into partnership with the state and locality in the building of these roads, so if there should be any graft or extravagance, the national government would have to shoulder the whole blame, for that is the way those things go. If my plan of national reward for building good roads were put into effect, all trouble of the aforementioned kind would be obviated.

Further, I am cognizant of the fact that we have plenty of men who can build good roads economically in every state in the union, without getting them from Washington, and I believe it is best for states, counties and townships to do everything they can for themselves, rather than to transfer all their business in governmental affairs to Washington, or, in other words, I believe in the doctrine "Back to the people."

If your bill should become a law it would not be ten years before such an army of politicians and theoretical road builders would be employed, as to cost at least one dollar for every dollar expended in actual road building; while if the national road reward plan was adopted, the national share of administration expense of this system could be carried on as cheaply as the state reward is by me in Michigan, and I have built one hundred nine miles of gravel and macadam road this year, costing in all \$322,500, at an expense for state administration of less than one per cent of the cost. If I had been working under a state aid law such as some states have, it would have cost ten times this amount.

So, while I am with you in spirit, I am against any plan of paternal government, or the creating of another "ward-heeler" hospital at Washington. If I were in Congress I should do all I could to defeat the passage of your bill, but, at the same time, if you would introduce one along the lines I have suggested, I would do everything I possibly could to help you.

NATIONAL AID.

(Abstract of speech of Howard H. Gross, of Chicago, at Grand Rapids Convention.)

In speaking upon the question of national aid as a supplement to state aid in road building, Mr. Howard H. Gross, Secretary of the Farmers' Good Road League of Illinois, said in part as follows:

"The need of good roads is universal. It is the one thing needed above all others for the social and economic advancement of America to fulfill its high destiny. No part of the earth is so richly endowed with all material blessings as our own land. Here civilization must work out its greatest problems and here it should reach its highest and most perfect development. Wheresoever the American may travel he is always proud of his country and his flag; his humiliation comes when he is forced to admit that of all countries of the world our public roads are the worst, while we are the best able of any country to build roads.

Good roads are found practically everywhere in Great Britain, Continental Europe, and even in far-off Australia and New Zealand the road builder has done his work well. Even in Brazil, Argentine and other South American countries are to be found many highly improved and well cared for highways.

The query arises,—why is this so, and why are the people most noted for both enterprise and extravagance so far behind the rest of the world? As an advertiser says: 'There is a reason.' It lies in certain misconceptions that have obtained in this country from the first. Among these we may mention the following:

The public roads were regarded purely as a local matter; a subject relegated by law and common consent to the small unit of the township or the smaller one of the road district; that the condition of the highways in any locality affected only the local territory and was no concern of the great mass of people the country over. In the earlier days before the advent of railroads this conception was largely true; there was little or no commerce between the states; there were no great, broad market reports flashed daily from one end of the country to the other; each locality bought and sold upon its needs.

The conditions have changed and this change necessitates a new conception as to the importance of the highways. Now food products are shipped thousands of miles from where they are produced and proper distribution is one of the great questions of the age. So perfect and widespread has become the system of distribution that prices rise and fall upon conditions covering not only the entire country but in fact the whole world. As matters now stand, the cost and facility of transportation over country roads are of prime importance. Thus the local question has become a national one.

Another misconception was that the country roads belonged to the farmer—it was his duty to build and maintain them. After prevailing for one hundred and fifty years this idea has now given way. The new and true conception is that the roads are public property and it is the duty of the whole public to look after its own. This has crystalized in what is known as state aid in road building.

Another misconception that has been responsible for the waste of untold millions upon the highways was that anybody could build roads, while the facts are that anybody cannot do it. By reason of this millions of money was squandered by misdirected effort with no substantial benefit for the outlay. It is not necessary to say to this audience that it requires engineering skill plus experience plus equipment if good results are to be had in road building.

The apostles of good roads in securing the adoption of state aid in sixteen states within the last few years have made great progress. State aid is good; it is a great and necessary forward step, but it is not enough. The time has come to treat the subject upon the broadest lines. It is not only a state but a national question.

The reasons for national aid in road building may be briefly stated.

The federal government has authority to do so under the constitution. It was so held in the earlier years of our national life; it has acted upon this authority and thus established a precedent. The plan of national road building is world wide and a successful plan. It is the only one

that has ever solved the question as all European and other countries will testify. Here we have a world precedent as well as a local one.

Again, the federal government uses over forty per cent of those highways for rural mail delivery. So it has both use and need for good roads.

The cost of rural mail service is now about \$35,000,000 per year over generally bad, and sometimes over roads that are nearly impassable. Those in charge and in a position to know, estimate that with universally good roads the cost of performing the service would be reduced at least twenty per cent and the quality of the service would be greatly increased. In other words the bad road conditions cause a waste and unnecessary expense of at least \$7,000,000 per year, which is paid by all the people upon the one item of rural delivery.

The government statisticians estimate that the extra cost due to bad roads of moving the three principal crops to market: corn, wheat and cotton—is over \$50,000,000 per year. It is ultra-conservative to say that the money loss by bad roads entails a waste with no compensating benefit of approximately \$180,000,000 per year. Many estimate the amount at several times this enormous sum. We may fairly say that with good roads generally throughout the country, the resulting economy measured in money alone would be at least \$2.00 per year for every person in the land.

It may be said that the enormous sum of money required to build good roads would bankrupt the country. That would be an almost impossible task. True the amount required is colossal, but it can be very easily produced without any appreciable burden. *The economies effected in twenty years will build the roads.* No country in the world is or ever was so well able to finance this transaction.

Let us take a glimpse of the national debts and interest charges of a few of the leading nations and compare them with our own country, making the comparison on a per capita basis. Let us see how much of debt stands against each individual in the several countries, and the annual interest they must pay.

The debt of France is \$144.00 per capita. Annual interest, \$6.05.
The debt of Great Britain is \$88.85 per capita. Annual interest, \$3.47.
The debt of Germany is \$49.00 per capita. Annual interest, \$2.00.
The debt of Italy is \$82.00 per capita. Annual interest, \$3.89.
The debt of Spain is \$98.00 per capita. Annual interest, \$3.72.
The debt of Australia is \$278.00 per capita. Annual interest, \$10.89.
The debt of United States is \$11.11 per capita. Annual interest, \$0.29.

The above figures are more eloquent than words. Ten years ago the national debt of the United States was \$15.55 per capita and the interest charge 54 cents. This great reduction is due largely to the increased population.

If the government were to issue \$400,000,000 of two per cent bonds and use the proceeds in aiding road building it would place the debt per capita almost exactly where it was ten years ago, and would increase the interest charge from 29 cents to 39 cents per person per year. These bonds would be eagerly taken by banks as a basis of circulation and would give us a much needed increase in the volume of currency.

The interest charge to carry the bonds would be \$8,000,000 per year. Against this should be set the economy in the rural mail service which by reason of good roads will be at least \$7,000,000 per year, leaving a net charge of \$1,000,000 or a fraction over one cent per person per year. As the federal government is now taxing us for all purposes at the rate of \$10.00 per capita we may assume the added penny would not be felt. A tax of eight cents per person per year would pay the interest and would provide a sinking fund that would retire the bonds at maturity.

Let us assume the federal government should be wise enough and progressive enough to authorize an issue of \$400,000,000 of bonds as fast as the funds were required. How should the proceeds be used? May I suggest a plan that to me seems fair and practicable.

The proceeds of the bond issue to be pro rated among the states as follows: One-half on the basis of population and one-half on the basis of highway mileage. Thus the thickly populated states would have the advantage in the first distribution, while the more sparsely settled states would gain in the latter. An examination will show the plan is equitable.

A condition of the issue should be that each of the several states in order to receive its pro rata should raise within ten years say \$3.00 for every \$1.00 to be drawn from the national treasury. The proceeds of the bond issue to be expended upon the main highways used for rural mail delivery and in no event to exceed 25 per cent of the cost of the improvements. The work to be done under state supervision according to specifications submitted to and approved by the United States Department of Agriculture. The money to be paid out on certificates of the proper state officers, setting forth that the respective improvements have been completed, stating the cost thereof and that 75 per cent of the expenses had been paid by the state and local authorities.

The following shows approximately the amount certain states would receive in the apportionment:

Pennsylvania having 4.6 per cent total road mileage would receive	\$9,200,000
Pennsylvania having 8.4 per cent of population would receive	16,800,000
	<hr/>
	\$26,000,000
New York with 3.7 per cent mileage and 9.1 per cent population	25,600,000
Illinois with 4.4 per cent mileage and 6.6 per cent population	22,000,000
Ohio with 3 per cent mileage and 5.5 per cent population ..	17,000,000
Michigan with 3.2 per cent mileage and 3.1 per cent population	12,600,000
Kansas with 5 per cent mileage and 2 per cent population.	14,000,000

Only the main highways should be considered in the first campaign for good roads. Of Michigan's 69,000 miles of public highways not more than 25,000 may be regarded as main roads. The sum of \$12,600,000 would give to Michigan over \$500 per mile as national aid in road building upon these highways.

Not having the exact figures for Michigan at hand, let me point out what state and national aid would do for Illinois in a campaign covering ten years and during which \$60,000,000 should be expended upon the highways. Take as an illustration an average farm in Central Illinois, where the property is valued at from \$100.00 to \$150.00 per acre. The aggregate annual tax to liquidate the federal, the state and the local bond tax for the highest amount of bonds that can be issued under the constitution, at the highest rate of interest allowed by law would be approximately ten cents per acre per year and no more, and this expenditure will thoroughly and permanently improve all the mail highways of the state and connect every community from Cairo to Galena with a complete system of smooth, hard and delightful roads, and would add to the value of farm property at least five times the amount of taxes imposed upon farms to build the roads, and usher in a higher and better civilization, and would be the greatest good that under God could possibly come to that great commonwealth.

**RESOLUTIONS ADOPTED AT THE NATIONAL CONVICT LABOR
GOOD ROADS ASSOCIATION CONVENTION AT GRAND
RAPIDS, JULY 22 AND 23, 1908.**

“Resolved, That it is the sense of this convention that the federal government should pay a substantial part of the cost of permanently improving such public highways as are used for rural mail delivery, whenever the state and local authorities decide to improve the same.

“Resolved, That the chairman of this convention shall cause a copy of this resolution to be sent to the senators and congressmen representing the state of Michigan, together with a brief on national aid.”

ARE THE FARMERS OF MICHIGAN GETTING THEIR JUST DUE?

Are the farmers of Michigan getting their just due? From a New York or Connecticut standpoint, they are not, so far as help in building the roads is concerned. But some will say, “Why should the farmer have any help to build roads, why shouldn’t he, like a city citizen, build the road in front of his place?” Well, one reason is that it would cost as much or more than the abutting farms are worth in a large part of the country to build the kind of roads that satisfies anyone nowadays. Another reason is that the leading public highways are the connecting links between our villages and our cities, and are a continuation of those streets that run through those villages and cities, so that while the farms abut the roads on the sides, the villages and cities abut them on the ends, and these ends are where the milking of the country is done. So it is no more than fair that the milker, who is the dealer and the consumer in the village and city, should contribute something toward the improvement of these highways. Good roads are a bene-

fit to everyone. Without them you have uncivilization; with them you have civilization just as high as the roads are good.

In New York state, in townships assessed at less than five thousand dollars a mile, for every dollar that the rural community raises for repair of the common roads, the state contributes a dollar; in townships assessed at over five thousand dollars a mile, the state contributes ninety cents for each dollar raised. Connecticut and Michigan contribute nothing for repairs on the common roads.

For repair of roads built under the state aid plan, New York gives from ninety cents to one dollar for each dollar raised by the rural community. Connecticut gives from seventy-five to eighty-seven and one-half per cent of the cost of repair and maintenance of state aided roads. Michigan gives nothing.

For aid in building new gravel and stone roads, New York pays fifty per cent of the cost out of the state treasury, the county thirty-five per cent, leaving the township only fifteen per cent to pay. Connecticut pays seventy-five per cent of the cost in towns assessed for more than one million dollars and eighty-seven and one-half per cent in towns assessed for less than one million, leaving the towns to contribute from twelve and one-half to twenty-five per cent. Michigan pays about twenty-five per cent of the cost and leaves to the counties or townships seventy-five per cent of the cost of building the leading roads that everybody uses.

Some day enough of the farmers in Michigan will find out what the farmer is getting down east, and then they will wake up and demand what they should have.

While many consider it almost a crime to talk of bonding for road building purposes, yet it is the only plan that gives out pure unadulterated justice, for by bonding a county to build the leading highways, you get the roads at once, while the tax is spread over a period of years, thus taxing all those who will get the use and benefit of the roads.

Michigan is now going faster than any other state ever did so soon after adopting state help for roads, but she will have to materially increase her velocity before she reaches the standard of the east at the present time.

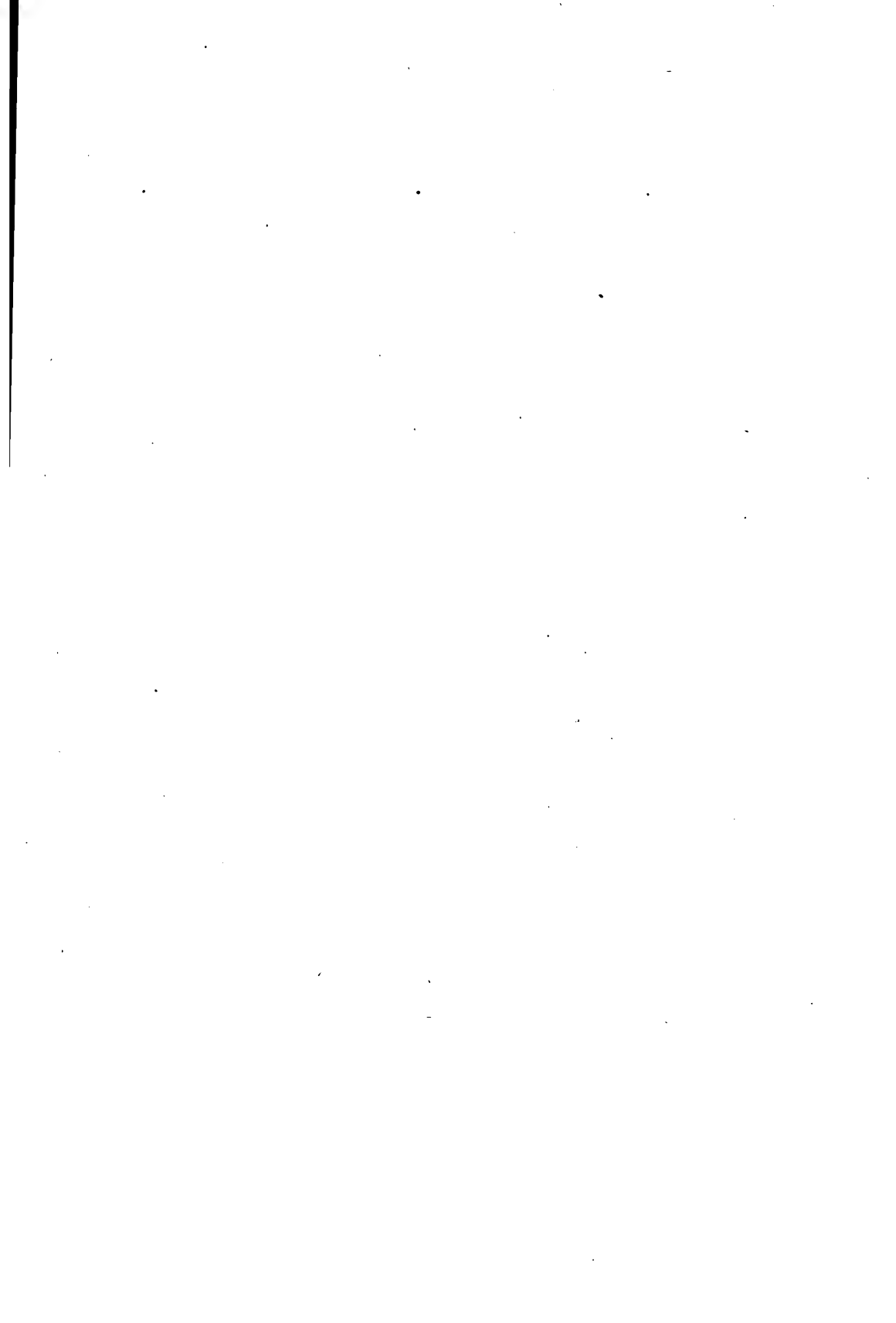
New York state voted to bond for fifty millions of dollars for roads. Connecticut has just appropriated seven hundred and fifty thousand dollars a year for the next six years for state aid for roads, or a total for the six years of nearly four million dollars, has raised the commissioner's salary to \$5,000 a year and furnished him an automobile. All this in a state that does not comprise as much territory as the four counties of Marquette, Dickinson, Iron and Menominee contain.

The Michigan farmer should be helped to the extent of half the cost of building the leading roads; and this can best be done by adopting the plan that the state highway commissioner tried to get the last legislature to enact into law, that of putting two hundred and fifty of the state's convicts to quarrying and crushing trap rock and selling it to any township or county in the state at cost of production and transportation but limiting the amount they may have to just enough to make the top course of the road, and by so doing make all the roads of the same excellent quality.

Some have claimed this would bankrupt the state, when in fact it would then not have put Michigan into a position where they would pay anywhere nearly as much of the cost of building the roads as the states of New York and Connecticut do.

No part of Michigan would have derived so much benefit from such a plan as would the upper peninsula, but even up there, it seemed hard to waken the people up to appreciate it. However it is bound to come, and one of these days prison labor will be utilized in making the state better, so allowing that class of citizens, who by their acts have made it worse, to, in a measure, redeem themselves by doing some good for the state they have wronged.

Of course some people are so tenderhearted on one side that they cannot bear to think of a prisoner having to work at good hard work, and so mighty blind and hard hearted on the other side that they cannot see that, if he does the easy work, he is taking away from honest men who are supporting themselves and their families, just so much of this easy work as he is doing. And again, if the convict were put at quarrying and crushing stone for roads, and it was sold to the townships and counties at a low price, it would give to the honest man the work that the convicts are now doing, and would besides furnish him employment in building the roads for which the stone is being quarried and crushed by the convicts.





State reward macadam road in Hart township, Oceana county. Built of limestone.



State reward macadam road in Cheboygan county. Built of crushed cobblestone by county road commission.

CONVICT LABOR.

CONVICT LABOR IN ILLINOIS.

BY A. N. JOHNSON, STATE ENGINEER.

The employment of convict labor in preparing crushed stone at the state penitentiaries in Illinois has attracted a great deal of attention and is one of the most interesting features of the work of the Illinois highway commission. The problem of the employment of convicts is one that has received much attention and is one that seems difficult of satisfactory solution. This arises from the fact that the conditions imposed are somewhat conflicting. For example, it is necessary that the employment be humane, that discipline can be maintained without undue expense and that the product of convict labor shall not interfere with existing industries or with free labor.

Convicts have been worked successfully in many states, and are today, in the manufacture of various articles, but this employment of the convicts has met with objections from those engaged in manufacturing a similar article, and also from free labor; these objections have been particularly strong in Illinois.

As illustrating a possible solution, at least in part, of this problem, an account of the use of the prisoners for making crushed stone as carried on at the two state prisons in Illinois will be instructive.

Many inquiries have been received from other states in regard to the details of this plan, which it is believed is one of the most practical ways of employing convict labor and at the same time is an aid to road construction. In a number of states, more particularly in some southern states, it has been the practice to work the convicts on the road itself and especially in North Carolina and Georgia a number of miles of road have been built successfully in this way.

There is, however, in most sections of the country a natural prejudice against exposing convicts on the public roads. It does not seem justifiable to place the opportunity for escape so alluringly before the prisoner and to impose as a penalty on his very natural desire to seize this opportunity the risk of being shot by armed guards stationed at a considerable distance as a protection against a sudden rush upon them. If a sufficient number of guards were provided to render the use of rifles unnecessary, it would be found that the cost of paying the guards would more than compensate for the reduced cost of the convict labor so that in the end the work would probably cost more than if performed with free labor.

Another, and perhaps more important, consideration would be the very natural feeling that the laboring man would have against competing in this way with convict labor which, moreover, would bring this class of work into more or less disrepute.

But the employment of the convicts inside the penitentiaries or within

the stockades, where they are not exposed to public view, and where the methods of guarding and other precautions taken against escape are practically the same as would be necessary whether the prisoners were idle or working, seems both humane and practical. Under these conditions, there is no additional cost to the taxpayers at large for the product of the prisoner's labor so that whatever is produced by their industry is so much gained by the community. Moreover, preparing the crushed stone interferes, in Illinois, with no existing industry as the crushed stone is, in almost every instance, used in places where it would not be used unless it could be secured at the specially low rates that this method of production secures. In fact, it can truly be said that the state, rather than interfering with an existing industry, is in reality creating an industry, for the total amount of crushed stone, even if all the convicts were employed, would at the most be very small when compared to that which would be necessary should any general scheme of road improvement be undertaken even in but a few localities.

Neither is free labor in anywise brought into unfair competition; on the contrary, work for free labor is created in constructing the roads which in many instances, would not otherwise be undertaken.

There is also another point of view which recommends this method of co-operation from the fact that no locality is at any increased expense for the benefits that certain communities, which secured the crushed stone prepared in this way, may derive; nor would the expense to any community be less if no one received the crushed rock, so that it is difficult to see how a more equitable plan of co-operation could be devised.

Replies to inquiries made of the prison officials regarding the success of this plan from the standpoint of prison management, report the plan to be successful. Warden Smith of the Southern Illinois Penitentiary states that the quarry work being all outdoor work is the most healthful of all the work at the prison except the farm work; as a result the prisoners are maintained in good health, which keeps them in a more cheerful and brighter frame of mind, which has—the warden remarks—a marked effect upon the discipline, and he has no hesitancy in saying that no better employment can be had in our prison than the work in the stone quarry department.

Warden Murphy of the Joliet penitentiary states that owing to the fact that the quarry is upon the prison grounds as good control of the prisoners is secured as though they were confined within the prison inclosure; he remarks, however, that he does not think the work would be practical if it were necessary to work the convicts on the public road. He concludes by saying that, 'as conducted, the work has proven to be a very good way for employing the inmates of the prison.'

This plan is perhaps peculiarly adapted to Illinois, owing to the distribution of road making material in the state, as there are large areas in which there is practically no rock and little or no gravel suitable for road making purposes. Therefore, if these materials are to be used they must be shipped in or supplied from some central plant. In areas with a more abundant supply of the material, the practical radius to which stone could be shipped would necessarily be more limited.

In order to make a complete success of this plan, it is necessary to

provide for the distribution of the crushed stone. This was done through the cooperation of the railroads, who made special freight rates, some of the roads making slightly better concessions than others; the general rate, however, being one-half cent a ton a mile, thus making it possible to ship one hundred miles for fifty cents a ton. The Illinois highway commission was enabled to effect this arrangement partly through the law which gave the commission authority to arrange for such rates with the railroads who were assured by the attorney general of Illinois that such rates could not be considered as discriminating against other shippers to whom they would not be liable necessarily to name similar rates.

In the two years in which this work has been going on some difficulties have been encountered, the chief of these were inability during the excessive freight movement of the past year to secure a sufficient number of cars from the railroads, which materially reduced the amount that could have been shipped. It was also found that large storage facilities are of convenience and almost double the capacity of the plants. This is for the reason that during many times of the year when the men can work in the quarries and stone can be crushed, the roads are not in condition to have the material used, but if the crusher can be kept running and a large amount supplied ahead, it will then be available when the roads are in condition for it; also in case the cars are not placed on a particular day, it is not necessary to stop the crusher for lack of storage room.

The crushing plants now in operation at the state prisons have a combined capacity of 1500 to 1800 cubic yards per day of eight hours. The Joliet plant consists of a No. 7½ gyratory crusher with a No. 4 crusher as an auxiliary. Storage is provided by storage piles which are filled by means of a cable on which is operated a large scoop which serves to convey the stone to the storage pile and also to take it thence to the cars as may be required. The cars may also be loaded directly from the crusher bins which have a capacity of 300 cubic yards. All of the machinery is electrically driven from the prison power plant.

At the Southern Illinois Penitentiary at Menard, two separate quarries have been opened. At one a No. 6 gyratory crusher has been installed. Storage facilities are provided at the older quarry by a pile of stone which is conveyed from the crusher by hand cars run out on a trestle. At the new plant, which is on a hillside, a large reinforced concrete storage bin was built so that one side of the hill serves to confine the stone which is carried to the storage pile in hand cars pushed out on a trestle. Railroad cars are run below the bin and are filled from gates in the floor of the bin; this bin has a capacity of 4,000 cubic yards and can be readily increased to any desired amount by extending the concrete construction along the hill side. The power for both of the plants at the Southern Penitentiary is furnished from independent steam engines.

During 1906, the first year of operation, there was shipped out 47,675 cubic yards; in 1907, 97,746 cubic yards. As the quarries become opened doubtless this output will be greatly increased.

The crushed stone thus prepared is, by law, furnished free to the township highway commissioners. The full text of the law is herewith given:

"An act authorizing and empowering the employment of convicts and

prisoners in the penal and reformatory institutions of the state of Illinois in the manufacture of tile and culvert pipe for road drainage purposes, and in the manufacture of machinery, tools, and appliances for the building, maintaining and repairing of the wagon roads of the state, and for preparing road building and ballasting material, upon the requisition of the state highway commission.

Section 1. Be it enacted by the People of the State of Illinois, represented in the General Assembly: That the board of prison industries of the state of Illinois is authorized and empowered, and it is hereby made its duty, upon the requisition of the state highway commission, to employ convicts and prisoners in the penal and reformatory institutions of the state in the manufacture of tile and culvert pipe, suitable for draining the wagon roads of the state, and in the preparation of road building and ballasting material, such tile, culvert pipe and road building and ballasting material to be furnished free; and in the manufacture of road machinery, tools and necessary appliances for the building, maintaining and repairing of the wagon roads of the state, such tile, culvert pipe, road building and ballasting material, road machinery, tools and appliances to be placed on railroad cars and forwarded to proper destinations, to be used as hereinafter provided:

Section 2. "The commissioners of highways in any township, in counties under township organization, or of the commissioner of highways, or boards of county commissioners, in counties not under township organization, may make application to the said state highway commission for such road building material, tile, culvert pipe, road making machinery, tools and other appliances as may be needed or required by them for the construction, improvement or repairing of wagon roads in their respective townships or road districts and where, by agreement, other commissioners of highways or boards of county commissioners in counties not under township organizations as the case may be, with the city council of any city, or the board of trustees of any village within the limits of such town, any gravel, rock, macadam or other hard road, is extended within or through the corporate limits of such city or village, then for the construction, improvement or repairing of so much of said roads as lies within the corporate limits of such city or village, provided such extensions within such city or village, shall be of the same cost and kind of material as the road outside such city or village, obligating themselves to use such material according to the rules and regulations formulated and approved by the State Highway Commission.

Section 3. "The State Highway Commission is hereby authorized and empowered to negotiate with railroad lines in the State of Illinois for rates of transportation on all such material and machinery, tools and appliances, and it may contract with such railroads for such transportation, to be paid in ballasting material at an agreed price."

Approved May 18, 1905.

Amendment, Approved June 3, 1907.

It will be noticed that the law provides for the manufacture of various other articles than crushed stone. Nothing, however, beyond making crushed stone has been attempted from the fact that it was not found practicable to do anything else. The question of furnishing tile drain was investigated to some extent but found to be impracticable.



Quarrying trap rock for macadam roads in Marquette county. The work the convicts should be doing.

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In conclusion, it can be said, that after a practical trial of over two years of this plan, it has worked successfully from every standpoint and there is a very strong sentiment for opening additional quarries in other parts of the state, thus increasing the areas of practical distribution.

CONVICT LABOR IN MISSOURI.

BY HON. CURTIS HILL, STATE ENGINEER, COLUMBIA, MO.

Missouri is the latest recruit to the ranks of those states which have placed road work under expert supervision. I mean by expert supervision, men who have the knowledge of road building and who are making the subject a study. Strictly speaking the actual construction of roads is a question of engineering, and naturally the supervision of the work falls to the civil engineer. The civil engineer by his long years of study, or by longer years of actual experience, is fitted to take up the work of road making.

Some of the new road laws of Missouri, which have become effective within the past year, make provisions for a state highway engineer and also for a county highway engineer of each county.

The state engineer is in the capacity of an investigator and an advisor upon matters pertaining to roads—more of a director of road affairs than of one in the actual charge and control of road construction. This official is appointed by and serves under the state board of agriculture. It was far sighted work upon the part of the framers of the law when they made the board of agriculture the state highway commission. The board of agriculture is a high classed body of men, is non-partisan, and Missouri being an agricultural state, that board is closer to a large number of the people who pay for the roads, than any other board could be.

The county highway engineer has the actual charge of all road matters of his respective county. He is the supervisor of the overseers and of all road work, and is in charge of the contracts and contract work, the regular road work, maintenance and repairs of all roads, bridges and culverts—in fact—is in charge of all road expenditures. I venture the prediction that you will hear of considerable advance under the new organization.

We haven't a very large percentage of highly improved roads in our state. Missouri has about 104,000 miles of public roads of which only 4,000 are hard surfaced. Of this 4,000 miles a very small part is highly improved, the larger part having been surfaced with rock or gravel in a loose kind of manner without competent supervision, and therefore, without attention to some of the details of construction which go so much toward making a good road.

Without taking your time in which to point out these particulars, permit me to pass on to the subject for discussion in this convention, that of convict labor upon the highways. It is one of the live subjects of

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the day and, in my opinion, can be accomplished without the abuse of prisoners.

I would like to get the people of my state interested in the question. Some states are utilizing the state convicts for quarrying and crushing the rock at central points and shipping the crushed material over the state to the places of improvement. I have a plan which is to utilize the convicts for the same purpose but in a slightly different way. Instead of shipping the rock, I would ship the convicts.

Road material of average quality is accessible in almost every county of the state, and over about one-half the area of the state, it can be found within reasonable hauling distance of any road. I would have the state own portable outfits for quarrying and crushing with an average output of about one hundred cubic yards per outfit per day, to be manned by state convicts. A steel cage with bunks which could be lowered and raised along the sides, on the order of a pullman coach, to accommodate sixteen or eighteen men, and mounted on wheels, for the prisoners. With crusher, cook and guard outfits on separate trucks, the whole could be hauled to the railroad, shipped to the next place where wanted, and again hauled out to the road or quarry. This quarrying and crushing should be in some form of state aid, the county or road district having done the grading necessary to prepare the road bed for receiving the rock and also having made arrangements to put on the rock after it is crushed for them.

There is a law of long standing on our books permitting any county to work the county prisoners upon the roads of the county. A few of the counties have taken advantage of it, but only one or two, to any great material advantage. But I wish to call your attention especially to one county, that of Greene, Springfield, the county seat, down in the land of the "Big Red Apple."

This spring, Green county succeeded in starting, under the supervision of their county highway engineer, a convict rock crushing outfit with county prisoners exactly like the kind I have just described. This has been at work all summer, and successfully. We have data upon the cost which I desire to give you. First, in explanation, let me state that the county convict crew is doing only the crushing, the road district doing everything else. So that the figures I now give you are the cost to the county for crushing only, which represents the percentage of cost paid by the county.

The plant consists of a crusher, a twenty horse-power traction engine, the convicts' cage, a cooking tent, and guard outfit. The force consists of two guards, an engineer, twelve prisoners and a team. The operating cost is:

Coal, \$1.50 per 10 hour day.

Oil, \$0.25 per 10 hour day.

One engineer, \$2.25 per 10 hour day.

One team and two guards, \$5.00 per 10 hour day.

Food for fifteen men at 40 cents, \$6.00 per 10 hour day.

Total, \$15.00 per 10 hour day.

The output has averaged about eighty cubic yards of crushed rock per day. The efficiency of the prison labor is about 60 per cent that of able bodied labor.

If we do not include the cost of plant, depreciation of machinery, etc., an output of eighty cubic yards at a cost of \$15.00 is 19 cents per cubic yard; 2,500 cubic yards of rock per mile of road gives a cost to the county of \$525.

With this output it is safe to say that we will build eight miles of road a year with the crew. If the life of the plant is five years, this is forty miles of road. The cost of the plant is \$4,000.00 of which $1/40$ or \$100.00 is the cost of the plant on one mile of road. Added to the cost of operating it gives a cost of \$625.

From my observation the enhanced valuation to the land for one mile on either side of the road is \$20.00 per acre—which is a conservative estimate. This gives an increased valuation for every mile of road built of $\$1280 \times 20 = \$25,600.00$.

Our constitutional limit for county taxes is 50 per cent on the \$100 valuation or an annual tax on the increased valuation of \$128.00.

In other words, the county invests \$625.00 of convict labor from which there is an annual dividend of \$128.00. It pays at the annual rate of about 20 per cent upon the investment.

This does not take into account the fact that it costs as much to feed the prisoners if they are in jail doing nothing. Suppose, individually, you had a number of unruly teams on your place which you had to keep tied up in the barns at a cost of 40 cents per team a day, and that you saw an opportunity to make an investment with the work of these teams, which would pay you an annual dividend of 20 per cent, how long would it take you to get those teams busy?

CONVICT LABOR IN THE STATE OF WASHINGTON.

The last session of the legislature passed a law permitting the board of prison control to use the convicts of the state in crushing rock for roads. The law provides that the work shall be done under direction of the board of control, the rock to be sold to the towns and counties desiring to use it.

To try the experiment the board put fifteen convicts at work at a place called Meskill in Lewis County, Washington, and the following is an account of how they succeeded: "Under the terms of the agreement the county takes the output of the quarry, paying therefor the actual cost to the state of maintaining the camp, less some thirty-two cents per man per day that it is now costing the state to maintain its prisoners. The county furnishes the machinery and provides quarters. The quarters consist of a cook house and a dormitory. The cook house is just such as may be found at any lumber camp. The dormitory is built of 2x8 planks laid flat upon each other and spiked together. The floor and ceiling are of the same kind of planks set up edgewise and spiked. The windows and doors are strongly barred.

The buildings and the quarry are within a strongly built stockade. At one side of the quarry a huge rock crusher run by a powerful engine,

breaks the rock fed to it into the sizes desired for the roads, which is loaded upon cars and sent to the different stations where it is wanted and from these stations hauled by wagons to the roads being improved.

The fifteen convicts were chosen by the board of control from the more than eight hundred in the penitentiary, not alone because they are all men who have served the major portion of their terms and have no criminal records—who are, in the vernacular of the prison, “trusties,”—but also because they have certain qualifications for this particular work. One of them, a tall and harmless looking Russian, is a splendid blacksmith. He is particularly valuable at the quarry. The tools there had been misused by the unskilled workmen in the days before the advent of the convict crew, so that all were more or less inefficient. A few touches from the Russian put them in shape for getting the best results. Then one of them is an engineer, competent they say to make an engine; here, he is in charge of the engine that runs the crusher and the pumps, and so is occupied at work that he delights in doing. The skillful cook is another member of the crew whose competency is no small factor in keeping the camp in health, good humor and consequent efficiency. Others of the crew were practical miners in the days before some false step or momentary yielding to passion ended in a felon’s cell. Their knowledge of drilling and blasting is of great value here.

Except for the high stockade with the armed guards in the sentry box at the corner, one coming unaware and uninformed upon this camp it work would scarce comprehend that it was an embryo penal colony. Stripes are not worn. The men are well fed and regard their assignment as a special privilege. They show it in the interest they take in the work. Thus far in the experiment, man for man, the convict crew has proven the equal of the best crew of paid laborers ever employed in the quarry.

The experiment in the use of convict labor in the preparation of road material that is now being made at Meskill will undoubtedly prove a success so far as the county’s getting cheap road material is concerned. There can be no doubt in the minds of those who have watched the experiment thus far that the work is the least objectionable as well as the most profitable of any at which the convicts can be put.

But it need not be surprising if the best result of the experiment is a more enlightened method of dealing with the punishment and reformation of the criminals of the state.”

OPINIONS REGARDING THE PRACTICABILITY AND THE DESIRABILITY OF EMPLOYING SOME OF THE CONVICT LABOR IN PREPARING ROAD MATERIAL AND SELLING IT TO TOWNSHIPS AND COUNTIES AT COST OF PRODUCTION AND TRANSPORTATION.

"ROAD MAKING BY PRISONERS."

(Editorial—Flint Journal.)

"As the discussion relative to the employment of prison labor on the roads and highways of the state proceeds, it is plain that there is a considerable number, and among them some good students of sociology, who favor the plan suggested by Commissioner Earle. One thing in connection with the proposal is that the convict labor problem would be settled for a long period, as a century of uninterrupted work by the state prisons would be none too much to put the highways of Michigan in passable condition.

Outside of what is best for the state, best for the roads and best for the laboring men employed in various trades, comes the question as to what is best for the prisoners themselves who are thus to be employed, and it is fair prognostication that it would be advantageous to the convicts, and would at once abolish two great prison evils, close confinement and lack of healthful employment. One ardent advocate, in discussing the matter the other day, stated that 'it is so simple and obvious a solution of the whole convict labor difficulty that it is surprising that anybody should oppose it.' It is a fact, however confident this man's views may seem, that humanity and expediency alike are in its favor.

There is no doubt but that the close confinement which the prisoners get in cramped quarters would be largely ameliorated by employing the convicts at open air labor and many of their ills which come as the result of unhygienic conditions, which it is difficult to overcome, would be remedied.

With this wider view of the situation it is to be seen that there are several important conditions entering into the problem, one of which, at least, is quite as important as the commercial aspect with its industrial complications. There is surely nothing more needed in Flint, in Genesee county and in the state of Michigan than a system of good roads. We have had the local plan in vogue for a great many years and a drive out into the country in any direction from this city or from any city in Michigan, for that matter, will demonstrate how inefficient and unproductive this system has proved to be. Township organizations do not appear disposed to tax themselves for the purpose of constructing proper highways.

We need the roads—this matter is very fully understood and appreciated by the public at large, and the employment of the prisoners in

this very useful and necessary work might solve the problem which has confronted the state, and be the means of providing the state with public highways which would be passable twelve months in the year, instead of only a small proportion of that time in many places and no portion of it whatever in other places."

"CONVICTS AS ROAD BUILDERS."

(Editorial—Herald-Leader, Menominee, Mich.)

"The news contained in the Herald-Leader dispatch, last evening to the effect that the bill introduced in the senate, at the suggestion of Horatio S. Earle, state highway commissioner, for an appropriation of \$200,000 for the building of a branch prison in Keweenaw county, is of special interest, particularly in view of the fact that it is likely to pass the house, because of its relation to two matters of vital importance to the state—good roads and the employment of convicts.

The need of good roads in Michigan is becoming more and more generally recognized. The good work has been started. Obviously there is much to be done in an educational way, much also to be done in a legislative way, in making laws that will compel economical and systematic disposition of road funds and very much to be done in the way of awakening a public sentiment that will bring about proper liberality in appropriations by state, county and local subdivisions for road purposes.

The interests of city and country are common in this matter. It cannot be said that it is a city affair, because good roads enable the farmer to bring his produce to the city, and thus help build it up and enrich it, any more than it can be said to be a country matter because good roads make it possible for the farmer to market his stuff. Both sides benefit, and neither could do without the other. While the city buys the farmer's products and gives him his living thereby, the farmer builds up the city by his patronage of its factories, jobbing houses and shops. Good roads benefit communities, and they benefit all. Therefore each should be willing to pay its share and to do its part in the work of fighting for good roads.

Clearly, money judiciously spent in making good roads is an excellent investment for the whole state. It cheapens the cost of bringing goods to market, and this gain is divided between the city and country, the city consumer getting part in increased profits. Therefore every dollar that can be put into good roads by the state so as to yield returns is an investment, and it is good business, not extravagance to so expend it.

And what of the second proposition, the employment of convicts? To make it possible to establish a binder twine plant in Jackson prison, the clause in the constitution forbidding trades being taught in prison was repealed at the last election. There was, however, a tremendous vote registered against the amendment, and now, because the state government has the power to set prison contract labor in competition with honest men, there is no reason why this course should

be pursued. Work for the convict is a necessity, but how to employ him, and make him self supporting without bringing his product in competition with the interests of labor and industry, it is difficult to decide. In the management of prisons Michigan has had all kinds of experiences from over indulgence on one hand to the discipline of the lash and other practices which do not look well in print, on the other. The wardens of our crowded prisons need the sympathy and support, rather than the criticism, of the public. The iron hand and the velvet touch have both been tried and both methods have failed to make a favorable impression or to produce satisfactory results.

While the general public is opposed to the abuse of convicts, there is at the same time an increasing sentiment against allowing prisons to become snug refuges for indolent and vicious characters.

The time is ripe for the inauguration measure of reform in the prison system of Michigan. At this opportune moment a suggestion has been made which should be endorsed by the Michigan legislature. It is the building of a branch prison in Keweenaw county, with a view of employing inmates in the occupation of breaking stone to be used in the building of state roads.

The state of Michigan needs good roads, just as much as it needs for its convicts hard profitable labor that will not conflict with other workmen and industries.

The Keweenaw branch prison suggestion therefore kills two birds with one stone and much benefit would accrue to the state through its adoption.

Keweenaw county has the best rock for road making to be found in the state and every facility for its transportation to whatever point it may be desired to send it. Breaking stone for road making would be employment at hard labor in the truest sense of the word and the establishment of such a prison in Michigan would lend an additional terror to the penalty of wrong doing in the state and punishment would be given a stern aspect without resorting to methods of extreme cruelty. Nor is there in the plan the faintest suggestion of a return to the old chain gang system. The plan is simply to employ the convicts in quarrying the trap rock, while the work of actual road building will be done by free laborers. Mr. Earle deserves great credit for his energy in pushing the Keweenaw prison bill to the front, and the favor with which it is being received is most creditable to the legislators, as its passage and realization of the commissioner's project would be a great boon to the state."

"HONEST LABOR, THE TAX-PAYER OR TRAP ROCK."

(Editorial, Detroit Times, Detroit.)

"The State of Michigan is up against the problem that has confronted every state since the organization of human society:

'What shall we do with our prisoners?'

Few people realize that the taking of prisoners was the birth of civilization. When society reaches maturity prisoners will have all disappeared."

Prior to this birth, however, the combatants engaged in tribal warfare left the field either as victors or as beef. They had no use for prisoners. And as man was a law unto himself, there were no criminals within the tribe, which was a sort of loose federation of blood relations.

All this antedated the period of industrial pursuits.

Man's business up to this time had been the chase and war—the chase for food and clothing. And war for the protection of his hunting ground against invaders, or to invade the hunting domains of others.

But with the advent of cereals and vegetables as food, came the necessity of their cultivation. Then the object of war was broadened from one of defense or the conquest of hunting territory, to that of securing prisoners to cultivate the land, etc. The object of war from that time and for centuries following, was to kill as few men and capture as many prisoners as possible. It was called humane to capture and ferocious to kill.

Hence, civilization is the dividing line between the humane and the cannibal.

The prisoner, of course, worked for the tribe, not because he had disobeyed any law, but because he was a prisoner of war. In other words, he was a prisoner of the primitive state, whose industries, still in an infantile state and of secondary importance to the chase, were communal.

But in the course of time the cultivation of the soil became of first importance. As industrial pursuits advanced in importance the chase receded. The individualism of the chase soon began to manifest itself in industry. The former warrior reappeared as the master or feudal lord, and the prisoner became his personal slave or serf.

By this time civilization had advanced to the building of nations. This necessitated the formulation of codes of law for the government of the citizens.

The status of the prisoner was changed from a captive in war to one who had transgressed the law of the state.

During this time the former communal form of industry had also undergone a transformation. Private industry had taken its place and the state had nothing for its prisoners to do. For centuries more they were compelled to suffer from all the depraving effects of idleness, and starvation in narrow cells, or to rot of disease or to be devoured by vermin in dungeons many feet under the surface of the earth.

Imprisonment was for the ugly purpose of revenge.

The progress of industry freed both the bondman and the serf, but industry itself has become more and more the property of private individuals.

The growth of the state, the multiplicity of its laws and the ever-increasing intensity of the struggle between the individual owners of industry for supremacy, and the free laborer for subsistence, have constantly increased the number of prisoners of the state and complicated the problem of what to do with them.

The humane instinct to spare life, has also been growing in the breast of mankind until at the present time instead of seeking to be merciful to a prisoner because he can be made profitable, it is now desired because he is a human being.

Between this instinct and the private interests of its citizens—those not yet in the penitentiary—the state is having its hands full. To furnish employment for its prisoners and not encroach upon any of the private profits of the owners of industry or the opportunities of the free laborer to get a living, is not an easy thing to do.

The penalogists do not want to interfere with private enterprise. Nor do they wish to be inhuman by denying prisoners healthful creative exercise.

To be just with the free laborer and tax-payer, this labor must also be useful.

The convict contract labor system has been tried. It has proved disastrous, both to the employer of free labor and the free laborers themselves. It is also an expense to the tax payers. It gives the convict contractor his labor at a cost so much below the cost of free labor that it drives the employer of this class of labor out of business, thus paralyzing free private industry and throwing the free laborer out of work, driving him into the prison and his family into the poor house—or worse.

And the tax payer has to make up all the deficiencies.

It would seem that the only thing for the state to do to meet the condition as it finds it, would be to do that for its prisoners which will accomplish the greatest good for the greatest number without subjecting them to the cruelties of barbarity.

For we must remember imprisonment is now for reform and not for revenge.

As the state stands stripped of all industrial privileges and cannot put its prisoners at productive work, that they may be made to not only support those dependent upon them on the outside but the expense of their own maintenance as well, their employment in the production of those things used by the state, townships and municipalities, would seem the most sensible thing to do with them.

Large profits—and graft—have to be paid out of the public treasury for these things every year.

More, many times over, than the public saves from the purchase of other lines of cheap goods sold by the prison labor contractors.

To this end a bill has been introduced in the senate, known as Senate Bill No. 349.

For the present it proposes to establish a prison in the Upper Peninsula near the trap rock beds, for the purpose of putting the more vicious prisoners at work crushing this rock, which is to be used in the making or remaking of roads and streets throughout the state.

This stone is to be sold to the townships, counties or cities at fifty cents a ton, F. O. B. destination.

It is figured that this price will cover the cost of maintaining the prisoners and leave a balance for the state treasury.

The contract system now leaves an annual deficit to be met by the tax payers. In return for which they do not get even good roads.

As the convicts are to only crush the rock, the establishment of the plant will furnish employment for a large number of free laborers in building the roads.

This will withdraw those convicts now engaged in the manufacture of cigars, chairs, brooms and numerous other commodities which come in direct competition with the free laborer and his employer.

The Times believes that a careful study of this bill will convince its most bitter opponents that it is based on progressive and sane lines.

It would be better, infinitely better, if we had no prisoners. But we have them, and will continue to have them until civilization reaches maturity. It is time we understood this and began to handle the problem in a manner creditable to a boy in his teens.

While this bill is only a start, it opens up a path along the line of the state using its convicts in the manufacture of only such things as it actually needs for public business.

A law similar to this is now in operation in the state of New York, where it is said to give satisfaction.

From the standpoint of public economy, it is unassailable."

BENEFIT BAY COUNTY.

C. C. ROSENBURY FAVORS PENITENTIARY BILL.

BAY CITY WOULD BE DISTRIBUTING POINT FOR TRAP ROCK.

(Bay City Times.)

"State could furnish stone to county cheaper than material now used," he says.

There is much interest being manifested in this city, and in fact throughout the state, it is said, in regard to the bill which was passed by the senate last week providing for a state penitentiary in the trap rock region of the upper peninsula, where vicious criminals will be confined and their labor used in quarrying and crushing stone for road building purposes.

Charles C. Rosenbury, one of the most enthusiastic advocates of good roads in this county and vice president of the state good roads organization is a strong supporter of the measure and believes it should become a law. He says he has been familiar with its provisions from its inception, made a study of it and is firmly convinced that if the system were adopted it would not only mean much to the state in general but Bay City and Bay county in particular, for the reason that if the institution were once established this would become a distributing point for the rock to various counties in the lower peninsula. Mr. Rosenbury further states that when the measure was first introduced he recognized its value and personally circulated petitions among local labor organizations which endorsed the movement. Business men and tax payers signed the petitions urging the passage of the bill, and it is said that the same course was pursued throughout the state, receiving hearty endorsement.

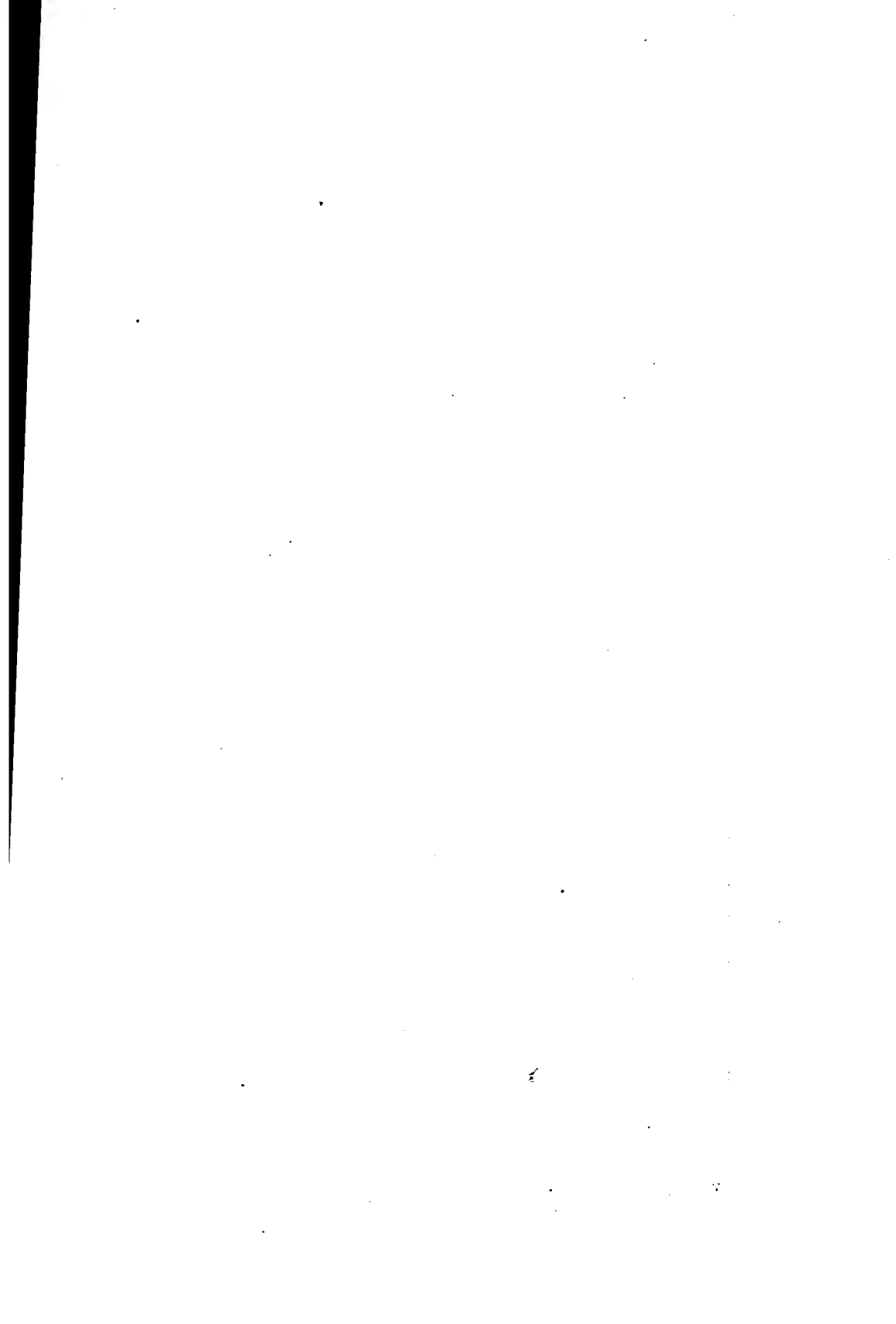
The proposition is that the prison shall be located at a point in the upper peninsula where there is an endless supply of trap rock, declared to be the very best of material for surfacing public highways and streets under the plans and specifications of the state highway commissioner. This material will be shipped by the state at fifty cents per ton on requisition from county road commissioners to the nearest railroad or marine points and the freight shall be pre-paid by the state.



Eighty-foot span, arched, reinforced concrete bridge built in Exeter township, Monroe county.
Cost \$2,029.



Flat top, reinforced concrete bridge built in Henrietta township, Jackson county.



"There were only eight votes cast against the bill in the senate," said Mr. Rosenbury to the Times, "and while the measure does not appear to meet with the approval of the administration it now looks as if the house will follow the senate and pass it with a nice majority. I believe this is one of the most important moves in connection with road building ever proposed in Michigan.

"It will not only furnish good employment for the vicious criminals now confined in the prisons at Jackson, Marquette and Ionia, but the product of their labor will create employment for hundreds of other men in handling the material and spreading it upon the roads. The quarry will be located so the rock can be shipped by boat as well as by rail and the natural conclusion would be that the shipments would be by boat to the lower peninsula for the reason that it would be cheaper. Hence the Saginaw river would be the distributing point to adjoining counties.

"These boats would also create new facilities for carrying coal and other commodities to the northern part of the state and would prove very advantageous to business in general. But what I am most anxious about is the building of good roads. It is a recognized fact that the material we have been using here for a number of years does not fill the bill. The crushed stone is soft and soon becomes fine and blows away. The trap rock is a more durable and satisfactory material for surfacing roads, and under the provisions of the proposed law it is my judgment that the expense would be greatly reduced in spite of the long haul. I have discussed the matter with many citizens, men as much concerned in the construction of good roads as myself, and they concur in the views which I have expressed. It would seem to me that there should be a united effort made by the people to bring pressure upon the legislature to pass the measure."

RESOLUTION ADOPTED AT THE NATIONAL CONVICT LABOR
GOOD ROADS ASSOCIATION CONVENTION AT GRAND
RAPIDS, JULY 22 AND 23, 1908.

"Whereas, Prisons in many instances, are breeding places of disease. Immured in contracted cells, working in gloomy shops from which air and sunshine are excluded, convicts fall an easy prey to consumption, insanity and kindred diseases. A short sentence to prison is for this reason often a sentence to death, and the victim when discharged not only becomes a burden upon his relatives and the public, but spreads disease and death in the community. Work in the open and exercise in the sunshine, on the contrary, such as would be afforded in the preparation of road material, builds up and strengthens both mind and body.

"Whereas, The prison contract system is blighting and baneful. Housed, fed and clothed by the state and receiving nothing for their

work, convicts engaged in industrial pursuits are a competition which is paralyzing and pauperizing to free labor. Nor is their competition less destructive to the manufacturer who establishes his own plant and pays living wages. For the problems thus presented, the employment of convicts in preparing material for road construction offers a complete solution. Thus employed they will not compete with honest labor, and instead of injuring the community they will benefit it.

“This convention, believing that the interests of the state, of society and of humanity will be thereby best conserved, heartily approve of the utilization of convict labor in the preparing of road material in such manner as may be most practical and efficient.”

CONVICT LABOR.

OPINIONS OF MEMBERS OF THE GRANGE OF THE STATE OF MICHIGAN.

We have a petition containing 2,162 names relative to the plan of utilizing our convicts in quarrying and crushing stone for roads. The signers of this petition were asked to vote either “yes” or “no” on the proposition as seemed to them best, and the result showed that of the total vote, 1,715 registered “yes” and only 447 voted “no.”

This ought to be proof sufficient to the next legislature that the people of Michigan favor utilizing a portion at least of the convict labor of the state in preparing road material, and this petition will be handed to the roads and bridges committee of the 1909 legislature for their investigation and enlightenment.

THE CONVICT LABOR PROBLEM.

DEDUCTIONS MADE FROM THE FACTS BROUGHT OUT BY THE INVESTIGATION OF THE UNITED STATES GOVERNMENT INTO THE CONVICT LABOR PROBLEM.

FACTS.

Number of penal and reformatory institutions investigated	296
Number of inmates in juvenile reformatories.....	11,264
Number of convicts in penal institutions.....	74,771

DEDUCTIONS.

Number of adult convicts that should be put to quarrying and crushing stone for roads.....	50,000
Number of days' work such an army would perform each day, allowing for sickness	45,000
Number of days' work such an army would perform each year, allowing for sickness and holidays.....	13,500,000
Number of tons of stone such an army would quarry and crush each day by the use of modern machinery.....	170,000
Number of tons of stone such an army would quarry and crush each year by the use of modern machinery.....	21,750,000

Number of miles of road that could be built with the stone such an army would quarry and crush each day.....	85
Number of miles of road that could be built with the stone such an army would quarry and crush each year.....	25,500
Number of days' work at building roads the convicts would leave undone each day, for honest men to do, if put at quarrying and crushing stone.....	45,000
Number of days' work at manufacturing that the convicts would leave undone each year for honest men to do, if put at quarrying and crushing stone.....	13,500,000
Number of days' work at building roads the convicts would create each year for honest men to do, if put at quarrying and crushing stone	45,000
Number of days' work at building roads the convicts would create each year for honest men to do, if put at quarrying and crushing stone	13,500,000
Number of dollars honest men would earn each day by doing the manufacturing now done by the convicts and by building roads with the stone the convicts would quarry and crush	\$135,000
Number of dollars honest men would earn each year by doing the manufacturing now done by the convicts, and by building roads with the stone the convicts would quarry and crush	\$40,500,000
Number of people in the United States who would be benefited if the convicts were put to quarrying and crushing stone for roads and streets; such stone to be sold to towns, villages, cities and counties at fifty cents a ton, freight to be paid by the state, so that each would be equally favored	90,000,000

DATA RELATIVE TO EMPLOYMENT OF COUNTY, STATE AND UNITED STATES CONVICTS UPON PUBLIC ROADS OR
QUARRYING AND CRUSHING STONE FOR ROADS.

Name of State or Territory.	State law gives author- ity to county boards of supervisors to em- ploy county convicts on public roads.	State law gives author- ity to county boards of supervisors to em- ploy county convicts at quarrying and crushing stone for roads.	State law gives author- ity to boards of pri- son control to employ state convicts on public roads.	State law gives author- ity to boards of pri- son control to employ state convicts at quarrying and crush- ing stone for roads.	State law gives author- ity to boards of pri- son control to sell the labor of state con- victs to counties for work on public roads.	States that are using convicts on public roads.	States that are using convicts in quarry- ing and crushing stone for public roads.
United States.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Alabama.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Alaska.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Arizona.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Arkansas.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
California.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Colorado.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Delaware.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Florida.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Georgia.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Hawaii.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Idaho.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Illinois.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Indiana.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Iowa.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Kansas.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Kentucky.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Louisiana.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Maine.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Maryland.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Massachusetts.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Michigan.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Minnesota.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Mississippi.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Missouri.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Montana.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
Nevada.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
New Hampshire.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
New Jersey.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.
New Mexico.....	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes.

One special road,
yes.

New York.....	Yes.	Yes.	Yes.	Yes.	Yes.
North Carolina.....	Yes.	Yes.	Yes.	Yes.	Yes.
North Dakota.....	Yes.	Yes.	Yes.	Yes.	Yes.
Oklahoma.....	Yes.	Yes.	Yes.	Yes.	Yes.
Oregon.....	Yes.	Yes.	Yes.	Yes.	Yes.
Pennsylvania.....	Yes.	Yes.	Yes.	Yes.	Yes.
Philippine Islands.....	Yes.	Yes.	Yes.	Yes.	Yes.
Porto Rico.....	Yes.	Yes.	Yes.	Yes.	Yes.
South Carolina.....	Yes.	Yes.	Yes.	Yes.	Yes.
Tennessee.....	Yes.	Yes.	Yes.	Yes.	Yes.
Texas.....	Yes.	Yes.	Yes.	Yes.	Yes.
Utah.....	Yes.	Yes.	Yes.	Yes.	Yes.
Virginia.....	Yes.	Yes.	Yes.	Yes.	Yes.
Washington.....	Yes.	Yes.	Yes.	Yes.	Yes.
West Virginia.....	Yes.	Yes.	Yes.	Yes.	Yes.
Wisconsin.....	Yes.	Yes.	Yes.	Yes.	Yes.
Wyoming.....	Yes.	Yes.	Yes.	Yes.	Yes.



State reward macadam road in Jonesfield township, Saginaw county. Built of limestone by county road commissioner.



State reward macadam road in Jonesfield township, Saginaw county. Built of limestone. This township bonded for money to build macadam roads, and turned the money over to the county road commissioner to build the roads.

ASSESSED VALUATION
AND
HIGHWAY TAXES, 1908.

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
ALCONA COUNTY:				
Alcona.....	\$62,602 00	\$313 12	\$644 13	\$957 25
Caledonia.....	85,465 00	477 33	427 33	904 66
Curtis.....	80,680 00	403 70	708 70	1,112 40
Greenbush.....	33,810 00	169 05	169 05	338 10
Gustin.....	124,917 00	284 11	412 40	696 51
Harrisville.....	179,508 00	225 01	225 01	450 02
Hawes.....	65,193 00	306 63	427 43	734 06
Haynes.....	113,480 00	571 17	283 82	854 99
Mikado.....	96,110 00	397 80	480 80	878 70
Millen.....	45,987 00	229 93	229 93	459 86
Mitchell.....	90,795 00	453 96	453 89	907 85
Harrisville City.....	112,545 00			
Total.....	\$1,091,092 00	\$3,831 91	\$4,462 49	\$8,294 40
ALGER COUNTY:				
Au Train.....	\$363,875 00		\$2,000 00	\$2,000 00
Burt.....	721,615 00	\$3,003 00		3,003 00
Grand Island.....	369,795 00	500 00	1,200 00	1,700 00
Limestone.....	259,131 00	1,265 25	2,690 25	3,955 50
Mathias.....	227,650 00	1,226 06	1,426 96	2,653 02
Munising.....	1,209,351 00		2,008 22	2,008 22
Onota.....	411,725 00		1,320 20	1,320 20
Rock River.....	405,295 00	2,031 18	3,031 18	5,062 36
Total.....	\$3,968,437 00	\$8,025 49	\$13,676 81	\$21,702 30
ALLEGAN COUNTY:				
Allegan.....	\$642,525 00	\$1,285 00	\$1,000 00	\$2,285 00
Casco.....	883,615 00	2,284 00	3,500 00	5,784 00
Cheshire.....	528,877 00	793 32	500 00	1,293 32
Clyde.....	443,175 00	384 15	1,500 00	1,884 15
Dorr.....	875,375 00	1,750 00	2,000 00	3,750 00
Fillmore.....	1,185,675 00	2,361 34	1,685 67	4,047 01
Ganges.....	925,000 00	1,400 00	1,800 00	3,200 00
Gun Plain.....	1,559,615 00	1,157 54	4,057 02	5,214 56
Heath.....	399,390 00	998 47	1,996 95	2,995 42
Hopkins.....	1,106,375 00	2,765 50	2,765 50	5,531 00
Laketown.....	569,600 00	1,000 00	2,300 00	3,300 00
Lee.....	334,030 00	825 00	2,400 00	3,225 00
Leighton.....	745,680 00	1,118 52	1,200 00	2,318 52
Manlius.....	565,175 00	703 65	1,695 52	2,399 17
Martin.....	1,114,985 00	1,393 73	1,393 73	2,787 46
Monterey.....	681,800 00	1,375 50	4,075 50	5,451 00
Otsego.....	2,220,650 00	1,416 00	3,320 00	4,736 00
Overisel.....	1,047,850 00	1,047 85	4,100 00	5,147 85
Salem.....	723,290 00	1,085 46	3,600 00	4,685 46
Saugatuck.....	944,900 00	1,235 88	5,504 00	6,739 88
Trowbridge.....	888,265 00	1,776 53	3,000 00	4,776 53
Valley.....	162,875 00	405 00	500 00	905 00
Watson.....	709,050 00	886 89	500 00	1,386 89
Wayland.....	993,080 00	1,231 95	2,979 24	4,211 19
Allegan City.....	1,706,675 00			
Total.....	\$21,957,527 00	\$30,681 28	\$57,373 13	\$88,054 41

STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
ALPENA COUNTY:					
Alpena.....	\$341,300 00	\$1,706 50	\$853 25	\$996 48	\$3,556 23
Green.....	208,890 00	1,034 55	1,034 55	529 55	2,598 65
Long Rapids.....	320,075 00	1,424 50	712 25	768 86	2,905 61
Maple Ridge.....	124,515 00	1,622 80	611 70	357 80	1,592 30
Ossineke.....	176,795 00	886 00	403 00	463 82	1,752 82
Sanborn.....	86,065 00	430 41	830 41	265 08	1,525 90
Wilson.....	283,775 00	1,373 75	1,373 75	768 86	3,516 36
Alpena City.....	6,145,183 00			11,221 71	11,221 71
Total.....	\$7,686,598 00	\$7,478 51	\$5,818 91	\$15,372 16	\$28,669 58

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
ANTRIM COUNTY:				
Banks.....	\$401,775 00	\$1,010 44	\$2,020 88	\$3,031 32
Central Lake.....	412,820 00	413 95	2,000 00	2,413 95
Chestonia.....	420,125 00	1,050 31	2,100 50	3,150 81
Custer.....	190,370 00	951 85	1,201 85	2,153 70
Echo.....	247,740 00	619 35	1,238 70	1,858 05
Elk Rapids.....	808,112 00	124 19	2,117 27	2,341 46
Forest Home.....	320,695 00	244 72	479 76	724 48
Helena.....	160,805 00	804 03	804 04	1,608 07
Jordan.....	171,880 00	347 76	899 42	1,247 18
Kearney.....	326,455 00	789 07	813 92	1,602 99
Mancelona.....	1,145,665 00	1,489 69	5,726 43	7,216 12
Milton.....	220,410 00	440 82	1,002 05	1,442 87
Star.....	330,774 00	826 93	826 93	1,653 86
Torch Lake.....	44,020 00	220 10		220 10
Warner.....	258,605 00	700 00	848 40	1,548 40
Total.....	\$5,460,251 00	\$10,033 21	\$22,180 15	\$32,213 36

ARENAC COUNTY:				
Adams.....	\$86,970 00	\$216 88	\$633 75	\$850 63
Arenac.....	142,965 00	578 00	1,328 00	1,906 00
Au Gres.....	84,525 00	420 00	210 00	630 00
Clayton.....	179,985 00	400 00	400 00	800 00
Deep River.....	155,945 00	402 38	1,402 38	1,804 76
Lincoln.....	136,420 00	300 73	502 02	802 75
Mason.....	145,875 00	330 81	364 68	695 49
Moffitt.....	67,031 00	156 92	538 84	695 76
Standish.....	245,070 00	300 00	3,546 00	3,846 00
Turner.....	189,640 00	929 30	1,829 30	2,758 60
Whitney.....	136,080 00	651 35	1,651 35	2,302 70
Au Gres City.....	45,415 00			
Omer City.....	104,000 00			
Standish City.....	274,160 00			
Total.....	\$1,994,081 00	\$4,686 37	\$12,406 32	\$17,092 69

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
BARAGA COUNTY:					
Arvon.....	\$392,700 00	\$1,963 50	\$2,963 50	\$757 40	\$5,684 40
Baraga.....	1,031,675 00	3,407 30	1,289 72	1,476 20	6,173 22
Covington.....	326,325 00	.....	3,263 25	596 25	3,859 50
L'Anse.....	912,310 00	3,865 55	3,865 55	2,184 25	9,915 35
Spurr.....	478,790 00	2,393 95	.....	987 05	3,381 00
Total.....	\$3,141,800 00	\$11,630 30	\$11,382 02	\$6,001 15	\$29,013 47

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
BARRY COUNTY:				
Assyria.....	\$572,020 00	\$858 03	\$1,144 04	\$2,002 07
Baltimore.....	598,700 00	898 05	598 70	1,496 75
Barry.....	873,415 00	300 00	1,400 00	1,700 00
Carlton.....	827,753 00	1,655 26	1,655 26	3,310 52
Castleton.....	1,243,050 00	619 50	1,862 28	2,481 78
Hastings.....	741,510 00	1,112 26	370 76	1,483 02
Hope.....	511,100 00	638 88	638 87	1,277 75
Irving.....	629,430 00	800 00	800 00	1,600 00
Johnstown.....	712,320 00	557 39	313 53	870 92
Maple Grove.....	807,750 00	1,000 00	1,500 00	2,500 00
Orangeville.....	464,320 00	464 31	232 10	696 41
Prairieville.....	913,850 00	900 00	215 00	1,115 00
Rutland.....	533,050 00	1,066 10	1,066 10	2,132 20
Thornapple.....	1,068,590 00	1,200 00	1,500 00	2,700 00
Woodland.....	1,280,900 00	1,638 40	1,200 00	2,838 40
Yankee Springs.....	272,800 00	818 40	272 80	1,091 20
Hastings City.....	2,068,570 00	.....	.....	.....
Total.....	\$14,139,158 00	\$14,526 58	\$14,769 44	\$29,296 02

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
BAY COUNTY:					
Bangor.....	\$1,182,941 00	\$200 00	\$125 00	\$2,855 95	\$3,180 95
Beaver.....	450,500 00	1,110 67	888 54	1,005 68	3,004 89
Frankenlust.....	777,375 00	500 00	2,000 00	1,750 77	4,250 77
Fraser.....	392,040 00	.....	585 92	875 08	1,461 00
Garfield.....	202,275 00	464 50	764 50	459 48	1,688 48
Gibson.....	199,265 00	251 20	602 10	520 10	1,373 40
Hampton.....	1,657,871 00	2,000 00	200 00	3,716 79	5,916 79
Kawkawlin.....	558,425 00	693 33	2,000 00	1,246 70	3,940 03
Merritt.....	605,850 00	293 08	586 15	1,337 22	2,216 45
Monitor.....	1,458,164 00	1,013 83	3,027 26	3,293 12	7,334 21
Mt. Forest.....	152,850 00	386 56	1,084 13	440 35	1,911 04
Pinconning.....	445,498 00	835 23	2,209 30	1,014 93	4,059 46
Portsmouth.....	1,149,460 00	621 40	50 00	2,644 95	3,316 35
Williams.....	733,250 00	1,222 00	650 00	1,642 66	3,514 66
Bay City.....	15,762,656 00	.....	.....	27,431 90	27,431 90
Total.....	\$25,728,420 00	\$9,591 80	\$14,772 90	\$50,235 68	\$74,600 38

STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
BENZIE COUNTY.				
Almira.....	\$158,596 00	\$300 00	\$700 00	\$1,000 00
Benzonia.....	369,410 00	1,054 08	1,846 55	2,900 63
Blaine.....	142,665 00	427 97	427 96	855 93
Colfax.....	204,860 00	919 30	670 39	1,589 69
Crystal Lake.....	847,130 00	315 02	1,200 00	1,515 02
Gilmore.....	261,000 00	416 30	700 00	1,116 30
Homestead.....	342,770 00	1,343 00	1,343 00	2,686 00
Inland.....	204,520 00	1,022 60	815 00	1,837 60
Joyfield.....	142,700 00	428 10	713 50	1,141 60
Lake.....	61,215 00	306 08	306 08	612 16
Platte.....	198,748 00	526 60	526 60	1,053 20
Weldon.....	270,425 00	737 00	1,352 13	2,089 13
Total.....	\$3,204,033 00	\$7,796 05	\$10,601 21	\$18,397 26
BERRIEN COUNTY:				
Bainbridge.....	\$680,795 00	\$954 10	\$2,044 49	\$2,998 59
Benton.....	1,742,153 00	3,000 00	3,000 00	6,000 00
Berrien.....	979,580 00	4,595 00	1,476 60	6,071 60
Bertrand.....	986,960 00	1,000 00	1,800 00	2,800 00
Buchanan.....	1,413,500 00	800 00	2,000 00	2,800 00
Chickaming.....	355,540 00	887 45	2,000 00	2,887 45
Galen.....	512,130 00	1,056 00	2,000 00	3,056 00
Hagar.....	378,675 00	721 35	1,000 00	1,721 35
Lake.....	784,070 00	1,440 43	2,300 00	3,740 43
Lincoln.....	547,990 00	2,000 00	2,500 00	4,500 00
New Buffalo.....	401,400 00	712 70	3,200 00	3,912 70
Niles.....	1,143,280 00	1,714 92	2,286 56	4,001 48
Oronoko.....	1,563,470 00	1,000 00	1,563 47	2,563 47
Pipestone.....	836,300 00	1,000 00	2,500 00	3,500 00
Royalton.....	689,270 00	1,600 00	1,700 00	3,300 00
Sodus.....	565,510 00	1,000 00	1,000 00	2,000 00
St. Joseph.....	561,480 00	.....	2,807 40	2,807 40
Three Oaks.....	767,130 00	.....	1,500 00	2,496 39
Watervliet.....	1,085,840 00	2,500 00	2,500 00	5,000 00
Weesaw.....	658,340 00	2,000 00	2,800 00	4,800 00
Benton Harbor City.....	4,849,654 00	.....	.....	.....
Niles City.....	2,172,353 00	.....	.....	.....
St. Joseph City.....	3,037,000 00	.....	.....	.....
Total.....	\$26,712,408 00	\$28,978 34	\$41,978 52	\$70,956 86
BRANCH COUNTY:				
Algansee.....	\$855,525 00	\$1,069 41	\$1,426 90	\$2,496 31
Batavia.....	860,650 00	1,000 00	500 00	1,500 00
Bethel.....	1,023,110 00	1,278 89	1,534 66	2,813 55
Bronson.....	1,408,770 00	1,600 00	2,000 00	3,600 00
Butler.....	852,745 00	1,085 00	3,900 00	4,985 00
California.....	519,330 00	1,030 00	515 00	1,545 00
Coldwater.....	1,248,215 00	2,500 00	2,200 00	4,700 00
Gilead.....	551,140 00	827 26	574 00	1,401 26
Girard.....	880,480 00	2,400 00	10 00	2,410 00
Kinderhook.....	451,620 00	889 66	222 42	1,112 08
Mattison.....	856,890 00	900 00	700 00	1,600 00
Noble.....	413,090 00	620 00	.....	620 00
Ovid.....	734,510 00	1,000 00	1,200 00	2,200 00
Quincy.....	2,038,025 00	2,250 00	1,500 00	3,750 00
Sherwood.....	916,610 00	858 30	1,058 31	1,916 61
Union.....	1,956,110 00	1,500 00	4,500 00	6,000 00
Coldwater City.....	4,215,740 00	.....	.....	.....
Total.....	\$19,782,560 00	\$20,808 52	\$21,841 29	\$42,649 81

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
CALHOUN COUNTY:				
Albion.....	\$1,069,450 00	\$1,310 15	\$600 00	\$1,910 15
Athens.....	1,025,030 00	923 96		923 96
Battle Creek.....	1,128,200 00	864 10	1,128 20	1,992 30
Bedford.....	1,154,640 00	2,309 28		2,309 28
Burlington.....	852,440 00	1,137 48	427 41	1,564 89
Clarence.....	626,355 00	626 36	626 36	1,252 72
Clarendon.....	724,040 00	3,364 86		3,364 86
Convis.....	528,690 00	528 49	422 80	951 29
Eckford.....	1,076,180 00	1,076 18	538 09	1,614 27
Emmet.....	873,180 00	1,000 00	2,200 00	3,200 00
Fredonia.....	753,140 00		1,250 00	1,250 00
Homer.....	1,319,950 00	988 86	1,319 95	2,308 81
Lee.....	579,645 00	869 46	1,000 00	1,869 46
Le Roy.....	933,175 00	1,493 08	840 84	2,333 92
Marengo.....	1,172,245 00	1,500 00		1,500 00
Marshall.....	1,055,740 00	1,355 74		1,355 74
Newton.....	699,120 00	875 10	875 10	1,750 20
Pennfield.....	734,770 00	1,837 54	1,575 00	3,412 54
Sheridan.....	800,140 00	380 00	535 00	915 00
Tekonsha.....	1,135,910 00	1,241 47	2,839 78	4,081 25
Albion City.....	2,769,860 00			
Battle Creek City.....	18,370,385 00			
Marshall City.....	2,434,175 00			
Total.....	\$41,816,460 00	\$23,682 11	\$16,178 53	\$39,860 64
CASS COUNTY:				
Calvin.....	\$727,034 00	\$727 00	\$500 00	\$1,227 00
Howard.....	638,140 00	1,276 28		1,276 28
Jefferson.....	615,710 00	1,115 71		1,115 71
La Grange.....	1,546,770 00	410 69	1,173 22	1,583 91
Marcellus.....	990,300 00	750 00	2,000 00	2,750 00
Mason.....	555,400 00	100 00	823 00	923 00
Milton.....	406,155 00	300 00	200 00	500 00
Newberg.....	580,615 00	896 00	600 00	1,496 00
Ontwa.....	652,520 00	652 52	652 52	1,305 04
Penn.....	957,940 00	835 37	936 59	1,771 96
Pokagon.....	808,492 00	1,000 00	808 49	1,808 49
Porter.....	1,022,190 00	2,500 00	1,500 00	4,000 00
Silver Creek.....	667,966 00	1,000 00	1,000 00	2,000 00
Volinia.....	835,810 00	700 00		700 00
Wayne.....	615,319 00	635 00	635 00	1,270 00
Dowagiac City.....	2,525,085 00			
Total.....	\$14,145,446 00	\$12,898 57	\$10,828 82	\$23,727 39
CHARLEVOIX COUNTY:				
Bay.....	\$134,270 00	\$335 68	\$335 67	\$671 35
Boyer Valley.....	361,685 00	1,271 89	1,808 43	3,080 32
Chandler.....	287,310 00		834 88	834 88
Charlevoix.....	122,325 00	611 62		611 62
Evangeline.....	55,325 00	275 38	275 38	550 76
Eveline.....	212,945 00	532 00	462 00	994 00
Hayes.....	233,905 00	584 76	584 76	1,169 52
Hudson.....	283,440 00	1,417 20	2,117 20	3,534 40
Marion.....	218,720 00	546 80	1,000 00	1,546 80
Melrose.....	302,760 00	605 52	1,211 04	1,816 56
Norwood.....	160,275 00	400 08	300 00	700 08
Peaine.....	88,820 00	444 08	221 25	665 33
South Arm.....	832,015 00	571 34	5,925 12	6,496 46
St. James.....	142,525 00	240 25		240 25
Wilson.....	202,800 00	473 45	473 45	946 90
Boyer City.....	1,206,673 00			
Charlevoix City.....	1,194,115 00			
Total.....	\$6,039,908 00	\$8,310 65	\$15,549 18	\$23,859 83

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
CHEBOYGAN CO:					
Aloha.....	\$91,130 00	\$475 65	\$237 83	\$186 47	\$899 95
Beaugrand.....	85,260 00	408 02	204 01	217 22	829 25
Benton.....	314,650 00	781 92	1,781 92	641 37	3,205 21
Burt.....	180,255 00	429 15	579 15	368 89	1,377 19
Ellis.....	128,684 00	352 77	502 77	274 46	1,130 00
Forest.....	252,515 00	1,195 27	2,195 27	317 41	3,707 95
Grant.....	165,500 00	407 55	407 55	339 13	1,154 23
Hebron.....	99,030 00	.....	500 00	202 67	702 67
Inverness.....	788,010 00	3,931 67	1,183 78	1,620 40	6,735 85
Koehler.....	205,485 00	1,078 72	1,078 72	430 30	2,587 74
Mackinaw.....	515,520 00	190 95	516 19	1,055 29	1,762 43
Mentor.....	198,260 00	1,015 05	1,917 60	405 73	3,338 38
Munro.....	173,910 00	218 95	218 95	356 54	794 44
Nunda.....	280,700 00	804 35	2,185 20	583 99	3,573 54
Tuscarora.....	193,670 00	507 35	1,014 70	401 63	1,923 68
Walker.....	190,180 00	1,002 13	1,002 12	400 60	2,404 85
Waverly.....	159,720 00	994 10	2,994 10	407 71	4,395 91
Wilmot.....	227,040 00	1,089 40	2,469 50	476 62	4,035 52
Cheboygan City..	2,349,601 00	.....	.....	4,903 38	4,903 38
Total.....	\$6,599,120 00	\$14,883 00	\$20,989 36	\$13,589 81	\$49,462 17
CHIPPEWA CO:					
Bay Mills.....	\$43,172 00	.....	\$100 00	\$150 35	\$250 35
Bruce.....	534,280 00	\$886 40	590 93	1,093 57	2,570 90
Daffer.....	192,045 00	.....	838 00	356 20	1,194 20
Detour.....	250,910 00	710 66	473 77	549 37	1,733 80
Drummond.....	105,705 00	502 05	502 05	319 26	1,323 36
Kinross.....	175,830 00	700 00	700 00	449 84	1,849 84
Pickford.....	449,540 00	1,052 42	631 25	1,076 82	2,760 49
Raber.....	218,170 00	150 00	450 00	543 19	1,143 19
Rudyard.....	364,125 00	750 00	1,500 00	894 60	3,144 60
Soo.....	690,635 00	2,020 31	.....	1,550 79	3,571 10
Sugar Island.....	71,325 00	329 68	329 68	196 74	856 10
Superior.....	828,807 00	3,314 47	828 70	1,705 37	5,848 54
Trout Lake.....	210,642 00	949 48	.....	590 50	1,539 98
Whitefish.....	389,960 00	.....	2,007 28	2,050 61	4,057 89
Sault Ste. Marie City.....	7,825,720 00	.....	.....	11,511 49	11,511 49
Total.....	\$12,350,866 00	\$11,365 47	\$8,951 66	\$23,038 70	\$43,355 83
Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.	
CLARE COUNTY:					
Arthur.....	\$132,860 00	\$664 35	\$1,415 05	\$2,079 40	
Franklin.....	35,585 00	88 57	177 13	265 70	
Frost.....	52,018 00	248 72	248 72	497 44	
Garfield.....	42,215 00	175 00	175 00	350 00	
Grant.....	195,700 00	503 13	*1,004 15	2,010 41	
Greenwood.....	142,300 00	336 56	503 13	673 12	
Hamilton.....	128,065 00	357 43	336 56	1,072 28	
Hatton.....	112,095 00	551 92	714 85	1,353 84	
Hayes.....	36,425 00	87 84	801 92	263 52	
Lincoln.....	98,950 00	478 48	175 68	1,006 96	
Redding.....	68,940 00	314 50	528 48	629 00	
Sheridan.....	257,500 00	633 71	314 50	1,529 42	
Summerfield.....	52,227 00	100 00	895 71	400 00	
Surrey.....	201,235 00	217 44	300 00	725 93	
Winterfield.....	82,190 00	300 00	400 00	700 00	
Clare City.....	358,935 00	.....	.....	.....
Harrison City.....	82,227 00	.....	.....	.....
Total.....	\$2,097 467 00	\$5,057 65	\$8,499 37	\$13,557 02	

* \$1,004.15 called "Good Roads District Tax."



Gratiot road, Wayne county. Tar-veneer macadam road built by county road commission.

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
CLINTON COUNTY:				
Bath.....	\$788,180 00	\$2,000 00	\$900 00	\$2,900 00
Bengal.....	1,311,800 00	1,311 80	1,800 00	3,111 80
Bingham.....	1,134,820 00	1,200 00	1,624 00	2,824 00
Dallas.....	1,521,950 00	1,800 00	2,500 00	4,300 00
DeWitt.....	1,206,130 00	2,372 78	2,372 78	4,745 56
Du Plain.....	1,279,010 00	1,360 00	3,450 00	4,810 00
Eagle.....	1,054,800 00	1,254 80	1,300 00	2,554 80
Essex.....	1,152,800 00	1,000 00	1,000 00	2,000 00
Greenbush.....	995,210 00	1,990 40	995 21	2,985 61
Lebanon.....	875,840 00	1,293 88	1,313 46	2,607 34
Olive.....	1,009,720 00	3,029 16	.....	3,029 16
Ovid.....	1,033,360 00	1,617 00	1,649 83	3,266 83
Riley.....	1,105,270 00	3,000 00	.....	3,000 00
Victor.....	842,060 00	1,263 19	700 00	1,963 19
Watertown.....	1,174,620 00	1,174 62	2,349 24	3,523 86
Westphalia.....	1,481,760 00	1,149 12	1,778 11	2,927 23
St. Johns City.....	2,043,790 00	.....	.....	.....
Total.....	\$20,604,920 00	\$26,816 75	\$23,732 63	\$50,549 38
CRAWFORD COUNTY:				
Beaver Creek.....	\$60,710 00	\$151 78	\$151 78	\$303 56
Frederic.....	628,725 00	1,575 77	3,299 78	4,875 55
Grayling.....	610,000 00	232 77	1,222 73	1,455 50
Maple Forest.....	199,710 00	998 55	699 42	1,697 97
South Branch.....	130,860 00	130 86	130 86	261 72
Total.....	\$1,630,005 00	\$3,089 73	\$5,504 57	\$8,594 30

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
DELTA COUNTY:					
Baldwin.....	\$163,877 00	\$409 69	\$819 38	\$338 38	\$1,567 45
Bark River.....	243,795 00	.....	500 00	503 39	1,003 39
Bay de Noc.....	141,895 00	709 48	709 48	292 99	1,711 95
Brampton.....	300,159 00	1,500 00	1,400 00	616 94	3,516 94
Cornell.....	194,245 00	971 38	971 37	401 08	2,343 83
Escanaba.....	214,805 00	643 58	643 58	445 02	1,732 18
Fairbanks.....	121,442 00	242 86	607 16	250 76	1,100 78
Ford River.....	269,545 00	1,497 72	2,997 72	670 13	5,165 57
Garden.....	407,394 00	.....	.....	965 08	965 08
Maple Ridge.....	504,865 00	2,524 32	4,524 32	1,011 48	8,060 12
Masonville.....	570,607 00	2,500 00	3,500 01	1,178 21	7,178 22
Nahma.....	489,961 00	980 00	490 00	1,062 26	2,532 26
Wells.....	659,445 00	.....	3,297 22	1,474 52	4,771 74
Escanaba City.....	4,021,150 00	.....	.....	8,265 63	8,265 63
Gladstone City.....	780,971 00	.....	.....	1,612 55	1,612 55
Total.....	\$9,174,216 00	\$11,979 03	\$20,460 24	*\$19,088 42	\$51,527 69
DICKINSON CO:					
Breen.....	\$269,420 00	.....	\$1,769 36	\$1,292 74	\$3,062 10
Breitung.....	529,535 00	\$2,681 40	.....	1,327 53	4,008 93
Felch.....	455,663 00	2,009 90	2,509 90	1,524 74	6,044 54
Norway.....	708,712 00	3,165 26	2,472 86	1,810 27	7,448 39
Sagola.....	750,345 00	.....	7,146 04	1,462 93	8,608 97
Waucedah.....	204,314 00	1,339 00	.....	906 61	2,245 61
Iron Mountain City.....	5,193,715 00	.....	.....	8,447 90	8,447 90
Norway City.....	2,266,615 00	.....	.....	4,120 93	4,120 93
Total.....	\$10,378,319 00	\$9,195 56	\$13,898 16	\$20,893 65	\$43,987 37

*County bridge tax included with county road tax.

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
EATON COUNTY:				
Bellevue.....	\$1,325,800 00	\$1,000 00	\$2,000 00	\$3,000 00
Benton.....	1,190,480 00	1,680 73	1,667 62	3,348 35
Brookfield.....	828,860 00	1,243 29	1,253 00	2,496 29
Carmel.....	1,033,560 00	2,034 00	1,017 00	3,051 00
Chester.....	1,078,700 00	1,618 95	1,078 70	2,697 65
Delta.....	1,136,000 00	1,704 00	1,000 00	2,704 00
Eaton.....	926,860 00	1,390 29	463 29	1,853 58
Eaton Rapids.....	839,610 00	839 62	2,099 25	2,938 87
Hamilin.....	947,370 00	947 37	1,894 74	2,842 11
Kalamo.....	931,230 00	1,862 46	931 23	2,793 69
Onelda.....	1,206,380 00	1,206 38	1,809 57	3,015 95
Roxand.....	1,112,370 00	1,873 36	1,112 37	2,985 73
Sunfield.....	897,325 00	1,512 30	1,500 00	3,012 30
Vermontville.....	1,019,420 00	703 39	1,022 12	1,725 51
Walton.....	1,268,700 00	1,262 61	1,500 00	2,762 61
Winor.....	1,069,230 00	1,343 46	1,065 04	2,408 50
Charlotte City.....	2,956,695 00	.....	.....	.....
Eaton Rapids City.....	1,164,275 00	.....	.....	.....
Grand Ledge City.....	1,476,110 00	.....	.....	.....
Total.....	\$22,408,975 00	\$22,222 21	\$21,413 93	\$43,636 14

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
EMMET COUNTY:					
Bear Creek.....	\$877,485 00	\$2,193 71	\$1,500 00	\$1,353 53	\$5,047 24
Bliss.....	138,480 00	830 88	.....	214 35	1,045 23
Carp Lake.....	219,200 00	451 92	545 00	341 10	1,338 02
Center.....	174,440 00	780 80	683 20	273 96	1,737 96
Cross Village.....	115,340 00	232 06	232 06	145 80	609 92
Friendship.....	184,185 00	356 71	535 07	280 02	1,171 80
Littlefield.....	251,430 00	852 91	1,507 15	354 81	2,714 87
Little Traverse.....	1,185,140 00	974 68	1,000 00	1,735 46	3,710 14
McKinley.....	411,265 00	1,105 20	2,000 00	629 41	3,734 61
Maple River.....	194,485 00	493 29	1,461 54	302 29	2,257 12
Pleasant View.....	133,672 00	668 36	668 36	203 96	1,540 68
Readmond.....	157,200 00	471 63	471 63	236 65	1,179 91
Resort.....	378,015 00	378 01	378 01	550 17	1,306 19
Springvale.....	170,980 00	854 90	854 90	264 25	1,974 05
West Traverse.....	357,760 00	894 40	894 40	561 84	2,350 04
Petoskey City.....	3,209,125 00	.....	.....	4,748 84	4,748 84
Total.....	\$8,158,202 00	\$11,539 46	\$12,731 32	\$12,196 44	\$36,467 22

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
GENESEE COUNTY:				
Argentine.....	\$727,800 00	\$1,819 50		\$1,819 50
Atlas.....	1,150,300 00	1,725 45		1,725 45
Burton.....	1,231,600 00	1,425 00	\$1,200 00	2,625 00
Clayton.....	1,093,325 00	1,660 12	1,660 12	3,320 24
Davison.....	1,191,200 00	800 00	1,200 00	2,000 00
Fenton.....	2,434,455 00	1,849 25	2,800 00	4,649 25
Flint.....	1,371,850 00	2,057 77	1,371 85	3,429 62
Flushing.....	1,644,775 00	1,195 33	1,644 78	2,840 11
Forest.....	494,425 00	300 00	1,000 00	1,300 00
Gaines.....	932,950 00	1,704 15	1,865 90	3,570 05
Genesee.....	1,104,750 00	996 15	2,104 75	3,100 90
Grand Blanc.....	1,221,075 00	1,221 07	1,221 07	2,442 14
Montrose.....	753,034 00	600 00	2,000 00	2,600 00
Mt. Morris.....	926,150 00	1,305 58	970 00	2,275 58
Mundy.....	996,040 00	1,500 00	1,300 00	2,800 00
Richfield.....	776,490 00	1,552 98	2,576 49	4,129 47
Thetford.....	658,575 00	1,316 94	800 00	2,116 94
Vienna.....	1,035,775 00	1,075 08	1,400 00	2,475 08
Flint City.....	12,198,445 00			
Total.....	\$31,943,014 00	\$24,104 37	\$25,114 96	\$49,219 33

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
GLADWIN COUNTY:					
Beaverton.....	\$103,810 00	\$253 42	\$1,053 42	\$208 68	\$1,515 52
Bentley.....	116,713 00	555 97	555 97	234 04	1,345 98
Billings.....	70,125 00	165 31	615 31	140 71	921 33
Bourett.....	99,105 00	380 00	597 00	198 86	1,175 86
Buckeye.....	152,024 00	736 45	736 45	303 98	1,776 88
Butman.....	116,500 00	598 55	499 27	233 77	1,331 59
Clement.....	46,516 00	213 02	363 02	87 68	663 72
Gladwin.....	268,201 00	618 00	800 00	545 40	1,963 40
Grout.....	216,775 00	583 66	933 66	434 98	1,952 30
Sage.....	152,000 00	366 10	957 20	308 33	1,631 63
Sherman.....	99,500 00	534 25	1,134 25	197 25	1,865 75
Tobacco.....	160,080 00	779 42	779 42	321 23	1,880 07
Beaverton City..	86,834 00			192 43	192 43
Gladwin City....	303,015 00			649 42	649 42
Total.....	\$1,991,198 00	\$5,784 15	\$9,024 97	\$4,056 76	\$18,865 88

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
GOGEBIC COUNTY:				
Bessemer.....	\$731,265 00		\$4,656 32	\$4,656 32
Erwin.....	414,450 00	\$1,037 58	1,659 86	2,697 44
Ironwood.....	811,545 00	2,840 00	2,028 99	4,868 99
Marenisco.....	690,924 00	3,419 12	4,419 12	7,838 24
Wakefield.....	990,100 00	4,803 05	2,500 00	7,303 05
Watersmeet.....	616,275 00	3,081 37	4,081 37	7,162 74
Bessemer City..	946,285 00			
Ironwood City..	5,525,405 00			
Total.....	\$10,726,249 00	\$15,181 12	\$19,345 66	\$34,526 78

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
GRAND TRAVERSE COUNTY:				
Acme.....	\$273,740 00	\$685 00	\$685 00	\$1,370 00
Blair.....	327,140 00	654 28	327 14	981 42
East Bay.....	238,990 00	995 96		995 96
Fife Lake.....	221,011 00	200 00	840 00	1,040 00
Garfield.....	532,260 00	1,864 90	799 24	2,664 14
Grant.....	282,150 00	705 38	432 15	1,137 53
Green Lake.....	238,300 00	595 75	595 75	1,191 50
Long Lake.....	272,774 00	265 18	530 36	795 54
Mayfield.....	377,400 00	377 40	1,255 80	1,633 20
Paradise.....	511,725 00	539 10	1,269 78	1,808 88
Peninsula.....	553,110 00	1,382 77	1,500 00	2,882 77
Union.....	77,735 00	194 34	194 34	388 68
Whitewater.....	322,445 00	807 21	1,129 04	1,936 25
Traverse City.....	4,678,415 00			
Total.....	\$8,907,195 00	\$9,267 27	\$9,558 60	\$18,825 87

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
GRATIOT COUNTY:					
Arcada.....	\$793,260 00			*\$3,966 30	\$3,966 30
Bethany.....	675,645 00	\$1,691 61	\$2,368 25		4,059 86
Elba.....	486,790 00	1,670 00	2,125 00		3,795 00
Emerson.....	755,970 00	1,512 00	2,268 00		3,780 00
Fulton.....	938,090 00	1,742 96	1,875 26		3,618 22
Hamilton.....	450,850 00	676 28	1,000 00		1,676 28
Ithaca.....	1,048,920 00	186 20	1,049 18		1,235 38
Lafayette.....	785,700 00	785 70	1,000 00		1,785 70
Newark.....	905,140 00	905 00	1,810 00		2,715 00
New Haven.....	604,070 00	1,214 64	1,214 64		2,429 28
North Shade.....	829,200 00	1,658 40	1,658 40		3,316 80
North Star.....	825,350 00	1,234 68	1,234 68		2,469 36
Pine River.....	616,755 00		4,436 45		4,436 45
Seville.....	518,100 00	1,551 30	1,075 65		2,626 95
Sumner.....	536,850 00			*2,700 00	2,700 00
Washington.....	700,090 00	1,049 38	2,448 56		3,497 94
Wheeler.....	640,125 00	1,200 00	1,600 00		2,800 00
Alma City.....	1,652,910 00				
St. Louis City.....	871,423 00				
Total.....	\$14,635,238 00	\$17,078 15	\$27,164 07	\$6,666 30	\$50,908 52

*Under township-county road plan.

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
HILLSDALE COUNTY:				
Adams.....	\$1,219,850 00	\$1,500 00	\$1,500 00	\$3,000 00
Allen.....	1,060,000 00	800 00	1,500 00	2,300 00
Amboy.....	754,540 00	1,515 49	2,036 86	3,552 35
Cambria.....	1,072,990 00	1,200 00	600 00	1,800 00
Camden.....	1,268,740 00	1,500 00	3,500 00	5,000 00
Fayette.....	1,380,050 00	1,600 00	3,148 66	4,748 66
Hillsdale.....	394,740 00	394 74	592 11	986 85
Jefferson.....	1,011,860 00	1,517 79	1,151 58	2,669 37
Litchfield.....	1,113,190 00	983 36	1,800 00	2,783 36
Moscow.....	938,800 00	500 00	1,173 50	1,673 50
Pittsford.....	1,095,320 00	3,096 32	500 00	3,596 32
Ransom.....	806,750 00	818 57	1,000 00	1,818 57
Reading.....	1,586,005 00	1,000 00	500 00	1,500 00
Scipio.....	849,550 00	1,280 77	853 85	2,134 62
Somerset.....	794,290 00	1,200 00	800 00	2,000 00
Wheatland.....	1,013,640 00	2,536 10	.....	2,536 10
Woodbridge.....	915,680 00	1,526 13	600 00	2,126 13
Wright.....	1,398,390 00	1,521 28	2,751 92	4,273 20
Hillsdale City.....	3,058,017 00	.....	.....	.....
Total.....	\$21,732,402 00	\$24,490 55	\$24,008 48	\$48,499 03
HOUGHTON COUNTY:				
Adams.....	\$16,623,690 00	\$5,000 00	.....	\$5,000 00
Calumet.....	41,297,115 00	.....	.....	.....
Chassell.....	240,005 00	.....	\$2,324 88	2,324 88
Duncan.....	439,439 00	.....	2,000 00	2,000 00
Elm River.....	1,098,910 00	1,000 00	1,000 00	2,000 00
Franklin.....	3,623,754 00	7,000 00	.....	7,000 00
Hancock.....	78,050 00	242 03	242 03	484 06
Laird.....	364,784 00	.....	3,653 62	3,653 62
Osceola.....	7,242,593 00	5,000 00	.....	5,000 00
Portage.....	6,282,836 00	.....	5,000 00	5,000 00
Quincy.....	2,963,291 00	.....	.....	.....
Schoolcraft.....	1,235,317 00	2,851 48	.....	2,851 48
Stanton.....	1,583,320 00	2,066 00	3,000 00	5,066 00
Torch Lake.....	4,575,890 00	4,426 75	2,287 95	6,714 70
Hancock City.....	2,575,399 00	.....	.....	.....
Total.....	\$90,224,393 00	\$27,586 26	\$19,508 48	\$47,094 74

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
HURON COUNTY:				
Bingham.....	\$559,730 00	\$414 61	\$700 00	\$1,114 61
Bloomfield.....	393,090 00	491 36	1,000 00	1,491 36
Brookfield.....	554,785 00	1,000 00	1,200 00	2,200 00
Caseville.....	189,515 00	165 25	400 00	565 25
Chandler.....	547,100 00	1,367 75	1,367 75	2,735 50
Colfax.....	429,900 00	644 85	1,053 00	1,697 85
Dwight.....	493,335 00	665 23	1,325 00	1,990 23
Fair Haven.....	348,820 00	624 00	624 00	1,248 00
Gore.....	74,405 00	150 00	200 00	350 00
Grant.....	326,090 00	815 00	1,350 00	2,165 00
Hume.....	363,830 00	727 66	1,500 00	2,227 66
Huron.....	354,200 00	442 75	1,485 50	1,928 25
Lake.....	166,355 00	200 00	1,275 00	1,475 00
Lincoln.....	385,310 00	666 41	500 00	1,166 41
McKinley.....	379,989 00	949 97	.....	949 97
Meade.....	401,900 00	809 00	1,550 00	2,359 00
Oliver.....	541,140 00	1,623 34	541 14	2,164 48
Paris.....	589,215 00	883 00	1,250 00	2,133 00
Pointe Aux Barques.....	122,600 00	.....	.....	.....
Port Austin.....	513,430 00	396 03	950 00	1,346 03
Rubicon.....	394,928 00	635 66	1,291 58	1,927 24
Sand Beach.....	962,740 00	1,200 00	2,230 77	3,430 77
Sebewaing.....	1,700,800 00	1,106 03	4,000 00	5,106 03
Sheridan.....	359,890 00	2,112 00	1,031 79	3,143 79
Sherman.....	734,365 00	1,176 52	2,000 00	3,176 52
Sigel.....	447,290 00	447 29	900 00	1,347 29
Verona.....	370,390 00	370 39	1,175 97	1,546 36
Winsor.....	1,042,550 00	1,587 70	4,692 78	6,280 48
Bad Axe City.....	513,150 00	.....	.....	.....
Total.....	\$14,240,842 00	\$21,671 80	\$35,594 28	\$57,266 08
INGHAM COUNTY:				
Alaledon.....	\$883,975 00	\$1,318 21	\$1,350 00	\$2,668 21
Aurelius.....	859,600 00	1,919 20	2,501 00	4,420 20
Bunker Hill.....	640,800 00	1,200 00	500 00	1,700 00
Delhi.....	892,535 00	1,785 67	1,071 04	2,856 11
Ingham.....	822,000 00	975 00	800 00	1,775 00
Lansing.....	1,219,600 00	2,395 44	1,197 72	3,593 16
Le Roy.....	809,350 00	708 78	800 00	1,508 78
Leslie.....	1,236,040 00	1,204 00	1,236 00	2,440 00
Locke.....	730,000 00	1,460 00	912 50	2,372 50
Meridian.....	1,130,240 00	1,095 36	1,695 36	3,390 72
Onondaga.....	797,150 00	1,192 86	795 24	1,988 10
Stockbridge.....	943,040 00	980 00	1,482 00	2,462 00
Vevay.....	776,615 00	1,164 92	776 61	1,941 53
Wheatfield.....	732,830 00	1,099 21	366 42	1,465 63
White Oak.....	593,890 00	949 27	599 51	1,548 78
Williamston.....	1,273,095 00	682 22	636 54	1,318 76
East Lansing City.....	255,255 00	.....	.....	.....
Mason City.....	949,020 00	.....	.....	.....
Lansing City.....	13,269,225 00	.....	.....	.....
Total.....	\$28,814,260 00	\$20,729 54	\$16,719 94	\$37,449 48

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
IONIA COUNTY:				
Berlin.....	\$991,870 00	\$1,487 80	\$1,983 74	\$3,471 54
Boston.....	1,174,970 00	759 70	1,762 45	2,522 15
Campbell.....	918,370 00	2,295 92	1,836 74	4,132 66
Danby.....	783,920 00	1,200 00	1,200 00	2,400 00
Easton.....	1,201,980 00	601 61	1,803 59	2,405 20
Ionia.....	923,600 00	1,380 07	1,961 80	3,341 87
Keene.....	841,710 00	2,000 00	700 00	2,700 00
Lyons.....	1,130,110 00	2,280 22	2,445 17	4,725 39
North Plains.....	868,405 00	1,000 00	5,125 00	6,125 00
Odessa.....	1,257,300 00	1,500 00	2,000 00	3,500 00
Orange.....	905,800 00	1,811 60	1,811 60	3,623 20
Orleans.....	742,350 00	742 35	1,200 00	1,942 35
Otisco.....	717,110 00	2,100 00	1,400 00	3,500 00
Portland.....	1,844,375 00	877 49	930 11	1,807 60
Ronald.....	1,028,205 00	1,000 00	1,000 00	2,000 00
Sebewa.....	690,070 00	1,388 00	347 00	1,735 00
Belding City.....	1,847,280 00			
Ionia City.....	2,675,880 00			
Total.....	\$21,043,305 00	\$22,424 76	\$27,507 20	\$49,931 96

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
Iosco COUNTY:					
Alabaster.....	\$163,825 00	\$100 00	\$200 00	\$310 02	\$610 02
Au Sable.....	171,177 00	600 00		328 26	928 26
Baldwin.....	61,265 00	76 59	50 00	136 77	263 36
Burleigh.....	115,435 00	276 64	553 00	269 90	1,099 54
Grant.....	63,429 00	161 22	723 44	155 01	1,039 67
Oscoda.....	102,080 00	273 20	529 02	200 60	1,002 82
Plainfield.....	211,740 00	875 00	1,101 00	364 74	2,340 74
Reno.....	117,616 00	588 03	788 03	255 31	1,631 37
Sherman.....	128,503 00	770 98	770 98	219 96	1,761 92
Tawas.....	169,950 00	424 88	500 00	364 74	1,289 62
Wilber.....	65,915 00	157 25	414 45	155 01	726 71
Au Sable City.....	27,518 00			72 94	72 94
East Tawas City.....	202,040 00			364 74	364 74
Tawas City.....	115,575 00			273 55	273 55
Whittemore City.....	34,639 00			67 47	67 47
Total.....	\$1,433,660 00	\$4,303 79	\$5,629 92	\$3,539 02	\$13,472 73
IRON COUNTY:					
Bates.....	\$313,562 00		\$1,500 00	\$970 19	\$2,470 19
Crystal Falls.....	775,595 00		3,877 98	1,631 81	5,509 79
Hematite.....	638,605 00	\$3,337 37		1,047 14	4,384 51
Iron River.....	753,916 00	2,700 00	700 00	1,375 67	4,775 67
Mansfield.....	264,560 00	300 00	1,118 88	1,060 18	2,479 06
Mastodon.....	272,360 00	1,908 72		820 42	2,729 14
Stambaugh.....	974,493 00		5,000 00	1,860 27	6,860 27
Crystal Falls City.....	905,380 00			1,167 19	1,167 99
Total.....	\$4,898,471 00	\$8,246 09	\$12,196 86	\$9,933 67	\$30,376 62

STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
BELLA COUNTY:				
Broomfield.....	\$257,500 00	\$649 53	\$649 53	\$1,299 06
Chippewa.....	459,430 00	551 28	1,300 00	1,851 28
Colo.....	1,316,320 00	1,205 85	1,316 82	2,522 67
Coldwater.....	201,190 00	500 00	600 00	1,100 00
Deerfield.....	322,330 00	795 00	2,696 05	3,491 05
Denver.....	329,585 00	700 00	1,350 00	2,050 00
Remont.....	458,240 00	916 48	1,316 48	2,232 96
Stillmore.....	270,755 00	674 84	674 84	1,349 68
Sabella.....	757,070 00	965 00	2,132 67	3,097 67
Lincoln.....	676,200 00	1,352 40	1,014 30	2,366 70
Pottawta.....	533,510 00	1,333 78	1,390 00	2,723 78
Toiland.....	354,270 00	887 57	1,044 49	1,932 06
Herman.....	169,800 00	424 50	924 50	1,349 00
Union.....	871,470 00	1,137 00	1,522 00	2,659 00
Vernon.....	590,450 00	691 04	791 04	1,482 08
Vise.....	303,875 00	759 48	1,765 60	2,525 08
St. Pleasant City.....	1,808,900 00			
Total.....	\$9,680,895 00	\$13,543 75	\$20,488 32	\$34,032 07
CKSON COUNTY:				
Blackman.....	\$1,064,930 00	\$2,130 00	\$532 50	\$2,662 50
Columbia.....	1,206,800 00	1,032 96	1,206 81	2,239 77
Concord.....	1,288,300 00	1,149 60	600 00	1,749 60
Grass Lake.....	1,524,000 00	1,060 00	2,286 00	3,346 00
Lanover.....	918,760 00	939 51	551 25	1,490 76
Lenietta.....	823,090 00	822 99	2,057 48	2,880 47
Leoni.....	1,130,825 00	2,200 00	1,100 00	3,300 00
Liberty.....	708,630 00	2,000 00		2,000 00
Napoleon.....	699,660 00	709 00	354 50	1,063 50
Orvell.....	678,000 00	847 50	271 20	1,118 70
Parma.....	887,700 00	1,191 71	1,111 25	2,302 96
Polaski.....	871,420 00	1,089 27	653 56	1,742 83
Rives.....	812,000 00	800 00	1,200 00	2,000 00
Sandstone.....	922,560 00	1,080 29	922 79	2,003 08
Spring Arbor.....	905,080 00	904 20	904 20	1,808 40
Springport.....	1,043,725 00	727 21	1,043 72	1,770 93
Summit.....	911,675 00	1,800 00	100 00	1,900 00
Tompkins.....	667,380 00	1,067 80	1,668 45	2,736 25
Waterloo.....	773,575 00	700 00	500 00	1,200 00
Jackson City.....	15,849,695 00			
Total.....	\$33,687,605 00	\$22,252 04	\$17,063 71	\$39,315 75
LAMAZOO COUNTY:				
Lamo.....	\$670,382 00	\$600 00	\$1,400 00	\$2,000 00
Brady.....	679,000 00	700 00	1,300 00	2,000 00
Charleston.....	786,510 00	755 55	1,893 25	2,648 80
Limax.....	1,133,111 00	1,400 00	400 00	1,800 00
Omstock.....	1,277,220 00	1,382 13	4,038 61	5,420 74
Cooper.....	788,200 00	2,000 00		2,000 00
Calamazoo.....	1,887,080 00	1,887 08	472 00	2,359 08
Shtemo.....	855,020 00	1,200 00	1,000 00	2,200 00
Avilion.....	651,585 00	651 58	500 00	1,151 58
Portage.....	721,000 00	1,081 50	400 00	1,481 50
Prairie Ronde.....	780,380 00	780 38	780 38	1,560 76
Richland.....	1,047,680 00		200 00	200 00
Toss.....	1,116,010 00	855 94	3,424 02	4,279 96
Schoolcraft.....	1,892,985 00	800 00	2,500 00	3,300 00
Exas.....	517,450 00	2,069 80		2,069 80
Vakeshma.....	817,270 00	817 27	500 00	1,317 27
Calamazoo City.....	19,834,585 00			
Total.....	\$35,455,468 00	\$16,981 23	\$18,808 26	\$35,789 49



Road in Lansing township, Ingham county, before improvement.

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
KALKASKA CO:					
Boardman.....	\$243,820 00	\$424 45	\$613 30	\$747 02	\$1,784 77
Clearwater.....	482,630 00	1,206 57	2,895 78	1,478 68	5,581 03
Cold Springs.....	304,750 00	1,397 30	1,397 30	933 69	3,728 29
Excelsior.....	309,655 00	774 13	774 13	948 70	2,496 96
Garfield.....	246,323 00	1,231 61	1,231 61	877 24	3,340 46
Kalkaska.....	498,500 00	281 17	600 00	1,546 85	2,428 02
Oliver.....	236,665 00	710 17	473 33	725 13	1,908 63
Orange.....	295,235 00	.....	732 41	904 54	1,636 95
Rapid River.....	434,080 00	1,151 12	1,151 12	1,329 93	3,632 17
Springfield.....	148,320 00	444 99	444 99	454 42	1,344 40
Wilson.....	71,200 00	178 00	356 00	218 14	752 14
Total.....	\$3,271,178 00	\$7,799 51	\$10,669 97	\$10,164 34	\$28,633 82
KENT COUNTY:					
Ada.....	\$608,735 00	\$2,098 01	\$1,498 57	.....	\$3,596 58
Algoma.....	806,350 00	1,533 82	1,612 70	.....	3,146 52
Alpine.....	1,186,500 00	1,000 00	3,000 00	\$296 41*	4,296 41
Bowne.....	871,560 00	1,743 12	2,440 37	.....	4,183 49
Byron.....	1,035,920 00	2,589 80	2,789 80	.....	5,379 60
Caledonia.....	891,890 00	1,327 08	1,812 84	.....	3,139 92
Cannon.....	711,560 00	600 00	2,834 64	.....	3,434 64
Cascade.....	676,810 00	.....	2,000 00	.....	2,000 00
Courtland.....	771,210 00	1,540 42	826 21	.....	2,366 63
Gaines.....	1,107,410 00	2,214 82	1,000 00	.....	3,214 82
Grand Rapids.....	2,310,847 00	2,838 94	2,006 61	501 65*	5,347 20
Grattan.....	800,790 00	2,001 97	2,001 98	.....	4,003 95
Lowell.....	1,406,260 00	1,027 24	3,515 65	.....	4,542 89
Nelson.....	606,575 00	964 00	2,123 00	.....	3,087 00
Oakfield.....	588,800 00	500 00	154 00	.....	654 00
Paris.....	1,845,750 00	1,800 00	1,000 00	445 14*	3,245 14
Plainfield.....	1,282,900 00	3,200 00	3,500 00	318 66*	7,018 66
Solon.....	636,400 00	618 32	2,193 59	.....	2,811 91
Sparta.....	1,628,475 00	1,500 00	3,390 00	.....	4,890 00
Spencer.....	408,880 00	1,200 00	200 00	.....	1,400 00
Tyrone.....	637,140 00	1,170 28	1,500 00	2,500 00†	5,170 28
Vergennes.....	822,225 00	1,633 35	500 00	.....	2,133 35
Walker.....	1,561,435 00	2,342 15	780 72	377 91*	3,500 78
Wyoming.....	1,865,980 00	3,469 47	3,665 96	417 65*	7,553 08
Gd. Rapids City.....	80,043,002 00	.....	.....	19,708 63*	19,708 63
Total.....	\$105,113,404 00	\$38,912 79	\$46,346 64	\$24,566 05	\$109,825 48

*Good Roads District.

†Township-county plan.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
KEWEENAW COUNTY:				
Alouez.....	\$5,027,400 00	\$15,082 21	.....	\$15,082 21
Eagle River.....	501,061 00	1,500 00	.....	1,500 00
Grant.....	716,327 00	3,300 00	.....	3,300 00
Houghton.....	487,245 00	1,000 00	.....	1,000 00
Sherman.....	506,389 00	1,519 17	.....	1,519 17
Total	\$7,238,422 00	\$22,401 38	.....	\$22,401 38

STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
KE COUNTY:				
Chase.....	\$191,540 00	\$478 85	\$478 85	\$957 70
Cherry Valley.....	68,925 00	172 32	172 32	344 64
Dover.....	90,200 00	225 50	225 50	451 00
Eden.....	51,091 00	255 49	455 49	710 98
Elk.....	167,850 00	839 25	1,139 87	1,979 12
Ellsworth.....	122,300 00	482 05	1,593 55	2,075 60
Lake.....	53,627 00	268 17	268 17	536 34
New Kirk.....	123,020 00	466 25	615 10	1,081 35
Winora.....	79,079 00	398 35	79 67	478 02
Pleasant Plains.....	204,465 00	.....	900 00	900 00
Webber.....	62,630 00	320 40	320 40	640 80
Total	\$1,215,318 00	\$3,906 63	\$6,248 92	\$10,155 55
PEER COUNTY:				
Almont.....	\$1,294,170 00	\$900 59	\$1,941 25	\$2,841 84
Arcadia.....	434,930 00	652 40	529 93	1,182 33
Atlica.....	743,230 00	741 00	400 00	1,141 00
Burlington.....	811,535 00	361 10	2,000 00	2,361 10
Burnside.....	952,800 00	1,000 00	952 80	1,952 80
Deerfield.....	428,100 00	428 10	1,200 00	1,628 10
Dryden.....	954,565 00	1,546 96	1,909 13	3,456 09
Elba.....	841,510 00	841 51	.....	841 51
Goodland.....	657,760 00	1,315 52	1,157 78	2,473 28
Hadley.....	969,300 00	1,500 00	500 00	2,000 00
May.....	1,179,920 00	1,998 75	666 25	2,665 00
Peper.....	719,600 00	1,079 40	750 00	1,829 40
Parathon.....	1,053,850 00	882 00	1,600 00	2,482 00
Payfield.....	506,890 00	1,500 00	1,600 00	3,100 00
Petamora.....	823,830 00	700 00	841 00	1,541 00
North Branch.....	934,160 00	812 73	3,000 00	3,812 73
Oregon.....	541,700 00	1,354 25	1,000 00	2,354 25
Rich.....	650,320 00	975 00	3,255 00	4,230 00
Peper City.....	1,554,770 00	.....	.....	.....
Total.....	\$16,052,940 00	\$18,589 31	\$23,303 12	\$41,892 43
BLANAU COUNTY:				
Bingham.....	\$188,970 00	\$472 42	\$472 43	\$944 85
Centerville.....	156,818 00	784 90	784 90	1,569 80
Cleveland.....	104,960 00	524 80	315 00	839 80
Linwood.....	191,958 00	575 87	.....	575 87
Empire.....	216,000 00	620 12	1,080 00	1,700 12
Pen Arbor.....	96,430 00	482 15	241 07	723 22
Casson.....	175,750 00	351 50	527 25	878 75
Celanau.....	385,195 00	675 30	1,925 93	2,601 23
eland.....	238,870 00	955 48	477 74	1,433 22
olon.....	184,790 00	554 37	554 37	1,108 74
ulton's Bay.....	202,000 00	583 12	505 00	1,088 12
Total	\$2,141,741 00	\$6,580 03	\$6,883 69	\$13,463 72

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
LENAWEE COUNTY:				
Adrian.....	\$1,311,700 00	\$2,500 00	\$2,500 00	\$5,000 00
Blissfield.....	2,052,280 00	877 77	2,565 35	3,243 12
Cambridge.....	984,450 00	1,200 00	1,100 00	2,300 00
Clinton.....	1,362,650 00	625 00	1,000 00	1,625 00
Deerfield.....	971,200 00	758 85	1,800 00	2,558 85
Dover.....	1,203,555 00	1,222 74	1,834 11	3,056 85
Fairfield.....	1,548,670 00	1,548 67	3,500 00	5,048 67
Franklin.....	1,093,350 00	2,000 00	2,000 00	4,000 00
Hudson.....	1,226,500 00	1,500 00	1,200 00	2,700 00
Macdon.....	1,075,075 00	1,093 11	1,639 11	2,732 22
Madison.....	1,334,380 00	1,334 38	4,000 00	5,334 38
Medina.....	1,398,210 00	1,747 76	4,150 45	5,898 21
Ogden.....	1,843,340 00	921 67	8,500 00	9,421 67
Palmyra.....	1,308,870 00	1,308 87	2,000 00	3,308 87
Raisin.....	1,264,750 00	1,300 00	2,400 00	3,700 00
Ridgeway.....	1,249,750 00	2,000 00	2,000 00	4,000 00
Riga.....	2,036,710 00	509 40	1,018 80	1,528 20
Rollin.....	1,121,770 00	1,064 52	1,300 00	2,364 52
Rome.....	967,510 00	2,000 00	1,000 00	3,000 00
Seneca.....	1,869,455 00	1,000 00	2,300 00	3,300 00
Tecumseh.....	2,029,600 00	700 00	3,560 00	4,260 00
Woodstock.....	1,195,540 00	1,000 00	2,000 00	3,000 00
Adrian City.....	6,654,920 00			
Hudson City.....	1,759,153 00			
Total	\$38,863,388 00	\$28,012 74	\$53,367 82	\$81,380 56
LIVINGSTON COUNTY:				
Brighton.....	\$1,180,800 00	\$1,025 32	\$887 77	\$1,913 09
Cohoctah.....	969,990 00	500 00	3,000 00	3,500 00
Conway.....	946,590 00	1,893 18	473 29	2,366 47
Deerfield.....	751,430 00	1,250 00	1,044 84	2,294 84
Genoa.....	800,050 00	800 05		800 05
Green Oak.....	665,990 00	665 75	1,664 48	2,330 23
Hamburg.....	742,730 00	742 73	650 00	1,392 73
Handy.....	1,595,400 00	1,270 07	1,707 40	2,977 47
Hartland.....	805,870 00	2,611 74	992 63	3,604 37
Howell.....	2,461,030 00	978 00	3,000 00	3,978 00
Iosco.....	739,165 00	900 00	800 00	1,700 00
Marion.....	930,060 00	902 45	930 06	1,832 51
Occola.....	837,050 00	1,500 00	500 00	2,000 00
Putnam.....	718,240 00	500 00	1,400 00	1,900 00
Tyrone.....	694,950 00	1,076 00	1,200 00	2,276 00
Unadilla.....	753,860 00	1,130 75	753 86	1,884 61
Total	\$15,593,205 00	\$17,746 04	\$19,004 33	\$36,750 37
LUCE COUNTY:				
Columbus.....	\$237,825 00	\$1,189 12	\$2,992 93	\$4,865 01
Lakefield.....	161,597 00	760 12	760 12	1,859 73
McMillan.....	1,621,418 00	1,399 77	1,125 57	5,602 74
Pentland.....	295,740 00	1,455 20	1,455 20	3,408 72
Total.....	\$2,316,580 00	\$4,804 21	\$6,333 82	\$15,736 20

STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.	
MACKINAC COUNTY:					
Bois Blanc.....	\$102,140 00		\$1,500 00	\$1,500 00	
Brevort.....	225,614 00	\$1,128 41	1,128 41	2,256 82	
Clark.....	181,317 00	500 00	500 00	1,000 00	
Garfield.....	165,060 00	825 30	2,030 30	2,855 60	
Hendricks.....	137,761 00	688 80	888 80	1,577 60	
Hudson.....	97,245 00	200 00	400 00	600 00	
Marquette.....	235,951 00	1,178 75	200 00	1,378 75	
Moran.....	114,485 00	503 20	503 20	1,006 40	
Newton.....	313,401 00		2,065 00	2,065 00	
Portage.....	181,190 00	905 00	1,105 00	2,010 00	
St. Ignace.....	162,136 00	810 50	2,010 50	2,821 00	
Mackinac Island.....	1,017,517 00				
St. Ignace City..	406,000 00				
Total	\$3,339,817 00	\$6,739 96	\$12,331 21	\$19,071 17	
MACOMB COUNTY:					
Armada.....	\$1,357,460 00	\$1,927 23	\$1,377 38	\$3,304 61	
Bruce.....	1,556,300 00	1,981 10	1,556 30	3,537 40	
Chesterfield.....	1,340,740 00	800 00	1,200 00	2,000 00	
Clinton.....	1,537,600 00	1,506 05	5,800 00	7,306 05	
Erin.....	2,108,150 00	1,003 85	1,003 85	2,007 70	
Harrison.....	1,613,300 00	2,016 61	2,016 61	4,033 22	
Lenox.....	1,430,700 00	1,847 60	3,530 00	5,377 60	
Macomb.....	1,262,450 00	1,894 13	2,800 00	4,694 13	
Ray.....	1,007,500 00	1,006 00	2,400 00	3,406 00	
Richmond.....	1,616,135 00	1,431 22	1,616 13	3,047 35	
Shelby.....	1,130,920 00	1,025 54	1,200 00	2,225 54	
Sterling.....	1,244,700 00	1,633 80	3,983 04	5,616 84	
Warren.....	1,809,030 00	1,612 63	4,750 50	6,363 13	
Washington.....	1,810,450 00	971 28	1,810 45	2,781 73	
Mt. Clemens City.....	5,979,800 00				
Total	\$26,805,235 00	\$20,657 04	\$35,044 26	\$55,701 30	
Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
MANISTEE CO:					
Arcadia.....	\$361,920 00	\$500 00	\$1,500 00	\$823 84	\$2,823 84
Bear Lake	480,155 00	813 74	2,227 33	1,040 21	4,081 28
Brown.....	194,420 00	388 84	194 42	388 84	972 10
Cleon.....	427,965 00	486 58	1,070 13	1,014 00	2,570 71
Dickson.....	203,985 00	509 96	1,019 92	367 97	1,897 85
Filer.....	806,419 00	850 00		1,613 05	2,463 05
Manistee.....	722,359 00	1,444 77	4,905 78	1,444 77	7,795 32
Maple Grove.....	127,182 00	317 95	922 32	254 36	1,494 63
Marilla.....	209,350 00	627 05	836 40	518 70	1,982 15
Oneskama.....	261,061 00	300 00	700 00	522 11	1,522 11
Pleasanton.....	250,275 00	312 84	312 84	566 53	1,192 21
Springdale.....	192,305 00	769 22	800 00	446 61	2,015 83
Stronach.....	335,692 00	440 66	440 66	671 38	1,552 70
Manistee City	5,226,055 00			9,795 98	9,795 98
Total.....	\$9,799,143 00	\$7,761 61	\$14,929 80	\$19,468 35	\$42,159 76

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
MARQUETTE CO:					
Champion.....	\$784,305 00	\$2,500 12		\$1,010 39	\$3,510 51
Chocolay.....	141,390 00	706 00		168 35	874 35
Ely.....	240,085 00	950 00	\$950 00	269 35	2,169 35
Forsyth.....	930,045 00	1,250 00	1,750 00	1,066 20	4,066 20
Humboldt.....	206,315 00	1,000 00	600 00	224 46	1,824 46
Ishpeming.....	147,772 00	738 52	888 30	225 60	1,852 42
Marquette.....	213,060 00	800 00	1,000 00	224 46	2,024 46
Michigamme.....	393,416 00	1,800 00		505 05	2,305 05
Negaunee.....	85,305 00	300 00	500 00	89 78	889 78
Powell.....	278,885 00	1,513 16	2,814 34	416 75	4,744 25
Republic.....	925,670 00	150 00	600 00	1,010 08	1,760 08
Richmond.....	182,067 00	910 00	290 00	252 52	1,452 52
Sands.....	65,925 00	316 74	316 83	84 91	718 48
Skandia.....	104,165 00	520 00	1,020 00	224 46	1,764 46
Tilden.....	538,628 00	2,000 00		673 39	2,673 39
Turin.....	271,740 00	1,157 00	1,157 00	303 03	2,617 03
Wells.....	223,075 00	1,088 14	1,788 41	282 08	3,158 63
West Branch.....	66,605 00	333 02	333 02	98 76	764 80
Ishpeming City.....	6,657,911 00			8,417 34	8,417 34
Marquette City.....	6,841,825 00			7,519 49	7,519 49
Negaunee City.....	6,177,529 00			6,933 12	6,933 12
Total.....	\$25,475,718 00	\$18,032 70	\$14,007 90	\$29,999 57	\$62,040 17
MASON COUNTY:					
Amber.....	\$320,930 00	\$477 00	\$318 00	\$951 24	\$1,746 24
Branch.....	122,925 00	355 55	233 85	364 35	953 75
Custer.....	406,680 00	524 31	1,343 48	1,205 43	3,073 22
Eden.....	245,900 00	614 75		728 85	1,343 60
Freeseil.....	266,460 00	724 55	1,274 55	878 71	2,877 81
Grant.....	202,820 00	507 05	1,014 10	601 16	2,122 31
Hamlin.....	183,690 00	774 76	193 69	574 10	1,542 55
Logan.....	95,310 00	776 55	476 55	282 50	1,535 60
Pere Marquette.....	363,015 00	464 84	464 84	1,061 84	1,991 52
Riverton.....	518,500 00	1,037 00	1,000 00	1,536 83	3,573 83
Sheridan.....	116,155 00	850 00	800 00	349 37	1,999 37
Sherman.....	285,840 00	714 60	1,429 20	847 23	2,991 03
Summit.....	224,470 00	561 00	449 00	665 33	1,675 33
Victory.....	336,060 00	1,008 18	672 12	996 48	2,676 78
Ludington City.....	2,896,930 00			8,408 66	8,408 66
Scottville City.....	308,695 00			914 97	914 97
Total.....	\$6,934,380 00	\$9,390 14	\$9,669 38	\$20,367 05	\$39,426 57
MECOSTA COUNTY:					
Aetna.....	\$186,150 00	\$613 88	\$935 62	\$342 98	\$1,892 48
Austin.....	138,710 00	416 13	609 84	277 25	1,303 22
Big Rapids.....	243,510 00	1,224 30		465 39	1,689 69
Chippewa.....	194,800 00	1,011 20	1,000 00	350 20	2,361 40
Collax.....	157,465 00	480 60	320 40	304 25	1,105 25
Deerfield.....	219,020 00	250 00	1,178 43	402 67	1,831 10
Fork.....	234,940 00	444 52	2,949 76	437 92	3,832 20
Grant.....	135,635 00	678 18	339 08	250 26	1,267 52
Green.....	332,235 00	1,301 90	650 95	616 38	2,569 23
Hinton.....	277,180 00	1,343 80	1,343 80	505 97	3,193 57
Martiny.....	115,310 00	287 25	287 25	238 42	812 92
Mecosta.....	369,305 00	1,483 87	812 47	812 47	3,108 81
Millbrook.....	266,750 00	667 00	1,000 00	467 70	2,134 70
Morton.....	154,915 00	236 40	774 58	273 26	1,284 24
Sheridan.....	136,438 00	677 09	169 27	253 64	1,100 00
Wheatland.....	330,735 00	1,322 94	1,653 67	564 16	3,540 77
Big Rapids City.....	1,499,628 00			3,312 50	3,312 50
Total.....	\$4,992,726 00	\$12,439 06	\$14,025 12	\$9,875 42	\$36,339 60

STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
DOMINEE Co:					
edenville.....	\$384,330 00	\$960 82	\$2,882 47	\$813 70	\$4,656 99
arris.....	521,840 00	1,304 60	2,609 20	1,089 79	5,003 59
olmes.....	420,260 00	2,101 34	.....	840 52	2,941 86
gallston.....	214,175 00	891 25	891 25	436 43	2,218 93
ellen.....	238,460 00	596 15	596 15	485 86	1,678 16
enominee.....	541,940 00	1,194 18	1,546 98	1,104 22	3,845 38
eyer.....	616,165 00	616 16	2,464 00	1,255 30	4,335 46
adeau.....	674,700 00	1,686 75	3,373 50	1,124 05	6,184 30
paudling.....	703,145 00	3,515 72	3,515 72	1,453 16	8,484 60
ephenston.....	804,280 00	1,453 14	4,010 70	1,728 60	7,192 44
enominee City.	5,416,101 00	.....	.....	11,036 37	11,036 37
Total.....	\$10,535,396 00	\$14,320 11	\$21,889 97	\$21,368 00	\$57,578 08

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
LAND COUNTY:				
denville.....	\$197,092 00	\$493 39	\$1,896 60	\$2,389 99
eneva.....	216,215 00	540 54	1,540 54	2,081 08
reedendale.....	89,130 00	445 93	2,273 38	2,719 31
omer.....	143,725 00	357 47	3,748 47	4,105 94
ope.....	221,320 00	550 00	550 00	1,100 00
rgersoll.....	459,060 00	918 12	2,100 00	3,018 12
isper.....	366,045 00	537 00	704 00	1,241 00
rome.....	145,490 00	727 45	2,827 45	3,554 90
arkin.....	264,550 00	939 85	1,104 88	2,044 73
ee.....	129,850 00	300 00	1,400 00	1,700 00
incoln.....	155,740 00	393 85	.....	393 85
idland.....	389,520 00	400 00	2,000 00	2,400 00
ills.....	93,888 00	469 67	869 67	1,339 34
t. Haley.....	191,040 00	118 45	1,098 45	1,216 90
orter.....	276,880 00	346 10	1,384 40	1,730 50
arren.....	237,545 00	594 62	650 00	1,244 62
leman City.....	239,125 00	.....	.....	.....
idland City.....	789,427 00	.....	.....	.....
Total	\$4,605,642 00	\$8,132 44	\$24,147 84	\$32,280 28

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
SAUKEE Co:					
etna.....	\$115,245 00	\$576 23	\$1,626 22	\$122 32	\$2,324 77
loomfield.....	108,100 00	270 25	270 25	107 65	648 15
utlerfield.....	73,249 00	366 27	1,387 27	73 73	1,827 27
ldwell.....	117,005 00	500 00	709 89	113 13	1,323 02
am Union.....	189,790 00	.....	2,394 80	184 40	2,579 20
terprise.....	60,830 00	152 28	608 30	70 42	831 00
rest.....	59,675 00	298 48	650 00	64 05	1,012 53
ike.....	347,580 00	868 95	868 95	372 82	2,110 72
orwich.....	163,460 00	408 40	500 00	173 10	1,081 50
oneer.....	143,520 00	300 00	.....	153 99	453 99
eder.....	260,600 00	250 00	800 00	267 19	1,317 19
chland.....	210,165 00	1,050 83	1,050 83	169 22	2,270 88
erside.....	134,955 00	674 89	1,038 15	134 98	1,848 02
est Branch.....	59,410 00	297 05	148 00	85 99	531 04
Bain City.....	89,703 00	.....	.....	89 70	89 70
Total.....	\$2,133,287 00	\$6,013 63	\$12,052 66	\$2,182 69	\$20,248 98

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
MONROE COUNTY:				
Ash.....	\$1,054,750 00	\$1,447 82	\$4,500 00	\$5,947 82
Bedford.....	1,298,015 00	1,622 00	3,000 00	4,622 00
Berlin.....	1,054,150 00	1,581 23	1,000 00	2,581 23
Dundee.....	1,502,900 00	1,072 05	3,381 52	4,453 57
Erie.....	1,096,370 00	1,370 45	4,659 57	6,030 02
Exeter.....	1,010,900 00	867 25	3,032 70	3,899 95
Frenchtown.....	1,386,500 00	1,600 00	1,500 00	3,100 00
Ida.....	1,076,770 00	1,076 77	2,153 54	3,230 31
La Salle.....	854,295 00	850 00	2,500 00	3,350 00
London.....	632,580 00	632 58	2,100 00	2,732 58
Milan.....	1,081,600 00	890 55	1,800 00	2,690 55
Monroe.....	757,950 00	1,100 00	.....	1,100 00
Raisinville.....	1,388,800 00	1,388 80	1,000 00	2,388 80
Summerfield.....	1,061,300 00	815 40	2,000 00	2,815 40
Whiteford.....	1,255,025 00	600 00	1,000 00	1,600 00
Monroe City.....	3,485,700 00	.....	.....	.....
Total	\$19,997,605 00	\$16,914 90	\$33,627 33	\$50,542 23
MONTCALM COUNTY:				
Belvidere.....	\$334,455 00	\$836 14	\$600 00	\$1,436 14
Bloomer.....	1,177,200 00	1,500 00	3,500 00	5,000 00
Bushnell.....	671,535 00	1,000 00	1,000 00	2,000 00
Cato.....	686,270 00	814 00	1,091 00	1,905 00
Crystal.....	517,530 00	1,000 00	2,400 00	3,400 00
Day.....	434,760 00	900 00	250 00	1,150 00
Douglass.....	358,255 00	895 63	500 00	1,395 63
Eureka.....	441,505 00	500 00	914 14	1,414 14
Evergreen.....	310,675 00	665 59	932 00	1,597 59
Fair Plain.....	551,290 00	1,650 00	.....	1,650 00
Ferris.....	389,050 00	972 62	972 62	1,945 24
Home.....	478,570 00	665 32	1,196 42	1,861 74
Maple Valley.....	557,840 00	1,386 25	1,386 25	2,772 50
Montcalm.....	546,855 00	835 27	556 85	1,392 12
Pierson.....	384,585 00	800 00	1,695 00	2,495 00
Pine.....	343,180 00	1,029 54	343 18	1,372 72
Reynolds.....	418,810 00	551 70	2,094 05	2,645 75
Richland.....	273,455 00	683 64	745 34	1,428 98
Sidney.....	296,055 00	680 17	600 00	1,280 17
Winfield.....	373,480 00	1,349 21	1,170 98	2,520 19
Greenville City.....	1,510,400 00	.....	.....	.....
Stanton City.....	319,055 00	.....	.....	.....
Total	\$11,374,810 00	\$18,715 08	\$21,947 83	\$40,663 91
MONTMORENCY COUNTY:				
Albert.....	\$166,030 00	\$415 12	\$415 12	\$830 24
Avery.....	102,620 00	513 10	513 10	1,026 20
Briley.....	152,406 00	762 03	381 01	1,143 04
Hillman.....	137,910 00	486 80	791 00	1,277 80
Montmorency.....	122,970 00	575 59	575 59	1,151 18
Rust.....	207,300 00	981 85	981 85	1,963 70
Vienna.....	170,855 00	854 27	.....	854 27
Total	\$1,060,091 00	\$4,588 76	\$3,657 67	\$8,246 43

STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County bridge tax.	Total highway taxes.
KEGON CO:					
Blue Lake.....	\$36,165 00	\$348 10	\$50 00	\$103 34	\$501 44
Enosvia.....	853,135 00	1,500 00	4,000 00	2,389 79	7,889 79
Mad Creek.....	125,885 00	307 40	614 80	358 20	1,280 40
Alton.....	188,330 00	359 15	300 00	556 66	1,215 81
Agleston.....	122,725 00	200 00	.....	360 68	560 68
Witland.....	271,400 00	650 00	1,200 00	841 70	2,691 70
Witport.....	688,843 00	543 38	1,722 16	1,946 89	4,212 43
Alton.....	341,030 00	550 00	1,200 00	954 04	2,704 04
Wketon.....	65,250 00	305 00	210 00	188 80	703 80
Montague.....	495,830 00	645 80	500 00	1,339 68	2,485 48
Worland.....	327,715 00	1,375 00	825 00	874 96	3,074 96
Wuskegon.....	271,000 00	633 18	379 90	919 30	1,932 38
Worton.....	435,420 00	1,300 92	1,800 92	1,248 70	4,350 54
Wavenna.....	721,220 00	1,801 96	3,000 00	2,078 50	6,880 46
Wlivan.....	179,275 00	355 40	533 18	443 11	1,331 69
Whitehall.....	513,790 00	127 00	269 62	1,480 64	1,877 26
White River.....	252,270 00	622 32	323 60	672 89	1,618 81
Wuskegon City.....	9,867,537 00	.....	.....	29,926 79	29,926 79
Wuskegon Hel'ts City.....	1,020,947 00	.....	.....	3,029 95	3,029 95
Wuskegon C'y.....	68,610 00	.....	.....	248 05	248 05
Total.....	\$16,846,377 00	\$11,624 61	\$16,929 18	\$49,962 67	\$78,516 46

Township.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
AYGO COUNTY:				
Wland.....	\$668,055 00	\$688 09	\$1,035 07	\$1,723 16
Worton.....	144,000 00	371 92	371 92	743 84
Waver.....	132,040 00	750 00	1,300 00	2,050 00
Wg Prairie.....	85,840 00	400 00	655 00	1,055 00
Wdgton.....	186,550 00	466 38	233 19	699 57
Wooks.....	337,110 00	373 27	1,685 55	2,058 82
Woton.....	296,911 00	1,484 55	2,200 00	3,684 55
Wyton.....	786,570 00	1,000 00	4,000 00	5,000 00
Wnver.....	263,965 00	1,078 00	1,050 00	2,128 00
Wasley.....	329,325 00	.....	2,000 00	2,000 00
Werett.....	74,230 00	350 00	350 00	700 00
Wrfeld.....	684,550 00	1,026 45	2,900 00	3,926 45
Wodwell.....	75,665 00	.....	678 82	678 82
Wtant.....	165,806 00	402 85	805 70	1,208 55
Wme.....	89,800 00	449 00	449 00	898 00
Wncoln.....	97,700 00	241 00	821 00	1,062 00
Wnroe.....	97,085 00	489 68	489 68	979 36
Wrwich.....	94,510 00	221 28	321 28	542 56
Wridan.....	748,500 00	1,600 00	3,700 00	5,300 00
Werman.....	225,007 00	562 50	562 50	1,125 00
Woy.....	86,060 00	439 45	.....	439 45
Wlcox.....	214,570 00	522 40	1,650 00	2,172 40
Total	\$5,883,849 00	\$12,916 82	\$27,258 71	\$40,175 58



Cook tent and office of Kalkaska county road crew.



Kalkaska county road crew preparing for afternoon's work.

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
OAKLAND COUNTY:				
Addison.....	\$745,100 00	\$1,000 00	\$1,500 00	\$2,500 00
Avon.....	1,986,300 00	2,171 50	3,984 10	6,155 60
Bloomfield.....	2,542,020 00	1,916 02	1,906 51	3,822 53
Brandon.....	958,710 00	1,070 00	767 00	1,837 00
Commerce.....	796,300 00	1,195 13	.....	1,195 13
Farmington.....	1,756,100 00	1,500 00	2,300 00	3,800 00
Groveland.....	595,550 00	893 33	250 00	1,143 33
Highland.....	920,750 00	1,200 00	200 00	1,400 00
Holly.....	1,461,750 00	684 00	1,461 75	2,145 75
Independence.....	957,515 00	1,000 00	500 00	1,500 00
Lyon.....	1,219,330 00	1,409 62	.....	1,409 62
Milford.....	1,127,260 00	600 00	1,400 00	2,000 00
Novi.....	1,051,800 00	1,500 00	500 00	2,000 00
Oakland.....	908,965 00	1,136 06	1,136 06	2,272 12
Orion.....	1,172,540 00	800 00	850 00	1,650 00
Oxford.....	1,528,630 00	1,000 00	600 00	1,600 00
Pontiac.....	861,470 00	800 00	861 47	1,661 47
Rose.....	725,020 00	725 00	100 00	825 00
Royal Oak.....	1,895,470 00	1,575 00	2,470 00	4,045 00
Southfield.....	1,238,375 00	1,238 37	929 95	2,168 32
Springfield.....	692,450 00	692 45	346 24	1,038 69
Troy.....	1,428,800 00	1,768 00	1,784 51	3,552 51
Waterford.....	935,800 00	1,178 00	.....	1,178 00
West Bloomfield.....	1,367,990 00	1,367 99	688 88	2,056 87
White Lake.....	605,530 00	423 87	181 66	605 53
Pontiac City.....	6,451,600 00	.....	.....	.....
Total	\$35,931,125 00	\$28,844 34	\$24,718 13	\$53,562 47
OCEANA COUNTY:				
Benona.....	\$332,710 00	\$887 82	\$2,663 47	\$3,551 29
Claybanks.....	263,020 00	591 98	1,183 96	1,775 94
Colfax.....	91,250 00	472 99	400 00	872 99
Crystal.....	169,365 00	920 70	700 00	1,620 70
Elbridge.....	427,560 00	2,413 82	2,413 82	4,827 64
Ferry.....	211,190 00	586 54	2,598 08	3,184 62
Golden.....	295,850 00	870 96	1,260 96	2,131 92
Grant.....	198,440 00	564 95	844 95	1,409 90
Greenwood.....	111,035 00	290 96	681 92	972 88
Hart.....	913,200 00	1,134 75	6,200 00	7,334 75
Leavitt.....	255,680 00	750 00	2,000 00	2,750 00
Newfield.....	208,815 00	621 72	3,298 89	3,920 61
Otto.....	63,335 00	323 88	398 88	722 76
Pentwater.....	276,155 00	400 00	938 60	1,338 60
Shelby.....	712,600 00	964 40	3,003 25	3,967 65
Weare.....	308,690 00	653 10	2,479 65	3,132 75
Total	\$4,838,895 00	\$12,448 57	*\$31,066 43	\$43,515 00
OGEMAW COUNTY:				
Churchill.....	\$109,720 00	\$547 97	\$273 98	\$821 95
Cumming.....	101,615 00	253 92	778 92	1,032 84
Edwards.....	143,425 00	383 56	613 56	997 12
Foster.....	50,612 00	253 06	253 06	506 12
Goodar.....	88,535 00	488 98	488 97	977 95
Hill.....	93,520 00	460 00	555 45	1,015 45
Horton.....	101,465 00	253 86	507 32	760 98
Klacking.....	100,472 00	511 75	511 75	1,023 50
Logan.....	101,012 00	250 00	400 00	650 00
Richland.....	301,697 00	767 50	1,260 20	2,027 70
Rose.....	209,180 00	1,112 40	1,112 40	2,224 80
West Branch.....	346,785 00	866 96	866 96	1,733 92
Rose City.....	96,720 00	.....	.....	.....
West Branch City.....	443,595 00	.....	.....	.....
Total	\$2,288,353 00	\$6,149 76	\$7,622 57	\$13,772 33

*Includes tax raised in townships under township-county road system.

STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
TONAGON COUNTY:				
Bohemia.....	\$348,755 00	\$1,743 77	\$2,243 77	\$3,987 54
Carp Lake.....	536,045 00	2,680 22	4,680 22	7,360 44
Greenland.....	718,245 00	2,200 00	800 00	3,000 00
Laight.....	206,425 00	1,016 15	2,048 28	3,064 43
Nterior.....	154,140 00	771 26	1,157 04	1,928 30
McMillan.....	98,970 00	1,000 00	2,000 00	3,000 00
Watcheswood.....	537,215 00	2,675 00	6,872 15	9,547 15
Wntonagon.....	985,990 00	2,113 60	8,953 55	11,067 15
Wockland.....	664,935 00	3,319 70	3,519 70	6,839 40
Wannard.....	196,625 00	.....	3,500 00	3,500 00
Total	\$4,447,345 00	\$17,519 70	\$35,774 71	\$53,294 41
DEOLA COUNTY:				
Burdell.....	\$261,160 00	\$700 00	\$1,513 60	\$2,213 60
Bedar.....	90,450 00	452 25	226 13	678 38
Bwart.....	303,595 00	1,000 00	1,500 00	2,500 00
Bartwick.....	175,330 00	909 55	1,209 55	2,119 10
Bersey.....	294,170 00	502 00	2,770 85	3,272 85
Bighland.....	250,940 00	1,254 70	1,254 70	2,509 40
Beroy.....	257,430 00	844 85	645 57	1,490 42
Bincoln.....	243,575 00	365 36	365 36	730 72
Barlion.....	244,120 00	723 70	1,219 85	1,943 55
Biddle Branch.....	109,971 00	500 00	500 00	1,000 00
Brient.....	138,200 00	691 00	766 00	1,457 00
Bsceola.....	549,820 00	584 70	1,774 55	2,359 25
Bichmond.....	1,041,790 00	1,007 02	2,704 47	3,711 49
Bose Lake.....	142,930 00	357 33	357 33	714 66
Bherman.....	309,600 00	774 00	1,024 00	1,798 00
Bylvan.....	153,340 00	703 54	703 54	1,407 08
Total	\$4,566,421 00	\$11,370 00	\$18,535 50	\$29,905 50

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County bridge tax.	Total highway taxes.
MODA COUNTY:					
Big Creek.....	\$181,125 00	\$452 80	\$452 80	\$212 00	\$1,117 60
Binton.....	144,745 00	700 00	700 00	166 00	1,566 00
Bomins.....	232,950 00	500 00	600 00	216 00	1,316 00
Bmer.....	259,250 00	400 00	400 00	266 00	1,066 00
Bentor.....	155,000 00	200 00	200 00	140 00	540 00
Total.....	\$973,070 00	\$2,252 80	\$2,352 80	\$1,000 00	\$5,605 60

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
OTSEGO COUNTY.				
Bagley.....	\$403,971 00	\$786 07	\$800 00	\$1,586 07
Charlton.....	205,060 00	600 00	800 00	1,200 00
Chester.....	142,500 00	712 50	712 50	1,425 00
Corwith.....	475,540 00	969 79	2,377 70	3,347 49
Dover.....	319,800 00	799 50	2,599 00	3,398 50
Elmira.....	368,460 00	921 15	921 15	1,842 30
Hayes.....	371,645 00	929 11	700 00	1,629 11
Livingston.....	428,800 00	495 87	1,000 00	1,495 87
Otsego Lake.....	133,980 00		700 00	700 00
Total	\$2,849,756 00	\$6,213 99	\$10,410 35	\$16,624 34
OTTAWA COUNTY:				
Allendale.....	\$625,760 00	\$1,251 52	\$1,251 52	\$2,503 04
Blendon.....	749,328 00	1,500 00	2,062 00	3,562 00
Chester.....	964,140 00	2,410 35	4,338 63	6,748 98
Crockery.....	497,457 00	1,244 14	2,000 00	3,244 14
Georgetown.....	1,227,780 00	2,455 56	1,800 00	4,255 56
Grand Haven.....	280,898 00	1,404 49	775 00	2,179 49
Holland.....	2,194,545 00	4,389 00	8,734 00	13,123 00
Jamestown.....	1,358,970 00	2,300 00	2,717 94	5,017 94
Olive.....	649,590 00	940 59	3,000 00	3,940 59
Polkton.....	1,338,260 00	1,800 00	5,300 00	7,100 00
Robinson.....	246,375 00	615 94	2,455 53	3,071 47
Spring Lake.....	859,525 00	1,005 02	2,700 00	3,705 02
Tallmadge.....	838,540 00	1,677 78	2,500 00	4,177 78
Wright.....	1,289,310 00	2,000 00	1,500 00	3,000 00
Zeeland.....	1,361,800 00	2,553 00	3,500 00	6,053 00
Grand Haven City.....	2,351,790 00			
Holland City.....	6,402,395 00			
Zeeland City.....	1,034,050 00			
Total	\$24,561,493 00	\$27,547 39	\$44,134 62	\$71,682 01
PRESQUE ISLE COUNTY:				
Allis.....	\$224,545 00	\$652 00	\$932 00	\$1,864 00
Bearinger.....	105,900 00	528 50	1,057 00	1,585 50
Belknap.....	356,552 00	873 28	873 28	1,746 56
Bismarck.....	90,040 00	400 00		400 00
Case.....	225,090 00	262 50	1,177 47	1,439 97
Krakow.....	97,234 00	200 00	300 00	500 00
Metz.....	198,863 00	200 00	1,000 00	1,200 00
Moltke.....	173,770 00	100 00	1,200 00	1,300 00
North Allis.....	137,275 00	473 00	1,084 50	1,557 50
Ocqueoc.....	112,570 00	283 93	283 93	567 86
Posen.....	287,287 00	558 04	1,409 11	1,967 15
Presque Isle.....	41,820 00		384 06	384 06
Pulawski.....	121,470 00	200 00	300 00	500 00
Rogers.....	327,879 00	500 00	500 00	1,000 00
Onaway City.....	572,205 00			
Total	\$3,072,500 00	\$5,561 25	\$9,501 35	\$15,062 60
ROSCOMMON COUNTY:				
Denton.....	\$115,830 00	\$340 12	\$340 12	\$680 24
Gerrish.....	409,070 00	780 97	830 97	1,611 94
Higgins.....	258,350 00	379 33	1,527 20	1,906 53
Markey.....	64,917 00	162 03	162 03	324 06
Nester.....	108,450 00	508 70	508 70	1,017 40
Richfield.....	287,320 00	721 88	804 59	1,526 47
Roscommon.....	199,750 00	826 28	826 28	1,652 56
Total	\$1,443,687 00	\$3,719 31	\$4,999 89	\$8,719 20

STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
WINAW COUNTY:					
Albee.....	\$325,500 00	\$833 00	\$1,642 00	\$634 73	\$3,109 73
Birch Run.....	624,275 00	1,560 68	1,560 68	1,217 34	4,338 70
Blumfield.....	924,500 00	940 52	2,207 90	1,802 78	4,951 20
Brady.....	654,220 00	585 21	892 81	1,275 73	2,763 75
Grant.....	399,255 00	998 13	1,350 00	778 55	3,126 68
Bridgeport.....	818,215 00	1,178 57	2,921 43	1,595 98	5,695 98
Buena Vista.....	1,157,435 00	1,157 43	1,500 00	2,257 00	4,914 43
Carrollton.....	884,500 00	442 25	907 75	1,724 78	3,074 78
Chapin.....	302,355 00	374 84	700 00	589 60	1,664 44
Chesaning.....	1,147,790 00	1,200 00	1,700 00	2,238 19	5,138 19
Frankenmuth.....	1,173,685 00	1,408 64	2,075 00	2,287 52	5,772 16
Remont.....	354,910 00	354 91	2,290 00	692 07	3,336 98
Ames.....	309,484 00	500 00	1,050 00	720 50	1,770 50
Onesfield.....	515,790 00	231 27	1,045 40	1,007 61	4,553 01
Cochville.....	446,250 00	313 88	231 27	870 19	1,332 73
Lakefield.....	260,230 00	363 34	1,662 59	507 59	2,564 06
Maple Grove.....	146,675 00	367 81	3,550 00	1,495 02	5,658 36
Marion.....	146,625 00	367 81	1,000 00	286 90	1,654 71
Richland.....	560,075 00	1,058 55	2,560 00	1,092 15	4,710 70
Waginaw.....	1,068,050 00	539 59	1,039 59	2,082 76	3,661 94
Paulding.....	317,525 00	400 00	400 00	619 17	1,419 17
St. Charles.....	878,300 00	1,394 30	2,402 16	1,712 69	5,509 15
Swan Creek.....	186,905 00	373 81	1,006 81	364 46	1,745 08
Weymouth.....	341,075 00	1,200 00	1,800 00	665 73	3,665 73
Thomasstown.....	445,470 00	300 00	1,700 00	868 67	2,868 67
Wittabawassee.....	870,150 00	870 15	1,210 07	1,696 89	3,777 11
Wilwaukee.....	205,465 00	513 66	513 66	401 10	1,428 42
Waginaw City.....	24,972,158 00	.....	.....	45,305 39	45,305 39
Total.....	\$41,116,267 00	\$19,801 54	\$42,919 12	\$76,791 09	\$139,511 75

Townships	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
WILAC COUNTY:				
Argyle.....	\$369,980 00	\$1,200 00	.....	\$1,200 00
Austin.....	310,325 00	300 00	\$500 00	800 00
Bridgehampton.....	531,085 00	707 15	4,100 00	4,807 15
Buel.....	430,200 00	864 30	1,728 40	2,592 70
Buster.....	508,360 00	763 32	763 32	1,526 64
Delaware.....	630,820 00	1,480 50	2,523 28	4,003 78
Elk.....	547,510 00	1,453 24	1,500 00	1,953 24
Elmer.....	434,050 00	1,085 12	1,085 12	2,170 24
Evergreen.....	367,660 00	731 44	914 30	1,645 74
Flynn.....	413,520 00	1,030 00	1,675 00	2,705 00
Forester.....	269,140 00	538 28	1,850 00	2,388 28
Remont.....	540,130 00	1,080 26	1,000 00	2,080 26
Greenleaf.....	320,000 00	960 00	1,160 00	2,120 00
Hamotte.....	328,070 00	656 14	1,000 00	1,656 14
Lexington.....	600,250 00	872 40	1,200 00	2,072 40
Maple Valley.....	490,890 00	1,200 00	1,500 00	2,700 00
Marion.....	664,130 00	1,200 00	2,000 00	3,200 00
Marlette.....	1,192,400 00	1,571 00	2,400 00	3,971 00
Minden.....	397,350 00	413 56	698 36	1,112 92
Moore.....	394,565 00	986 46	1,332 16	2,318 62
Sanilac.....	587,710 00	755 92	1,810 48	2,566 40
Speaker.....	543,210 00	958 90	1,086 42	2,045 32
Washington.....	530,275 00	1,200 00	2,400 00	3,600 00
Watertown.....	461,440 00	500 00	1,050 00	1,550 00
Wheatland.....	330,270 00	825 67	2,335 00	3,160 67
Worth.....	548,230 00	822 34	2,300 00	3,122 34
Wron City.....	242,750 00	.....	.....	.....
Wroswell City.....	646,870 00	.....	.....	.....
Wandusky City.....	307,820 00	.....	.....	.....
Total.....	\$13,939,030 00	\$23,156 00	\$39,911 84	\$63,067 84

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
SCHOOLCRAFT COUNTY:				
Cusino.....	\$79,710 00	\$300 00		\$300 00
Doyle.....	189,281 00	487 78	\$487 78	975 56
Germfask.....	111,190 00	530 00	530 00	1,060 00
Hiawatha.....	196,583 00	961 65	961 65	1,923 30
Inwood.....	66,353 00			
Manistiquie.....	146,906 00	781 01	700 00	1,481 01
Mueller.....	131,640 00	737 16	737 16	1,474 32
Seney.....	140,344 00	712 72	712 72	1,425 44
Thompson.....	295,314 00	869 14	869 14	1,738 28
Manistiquie City.....	1,509,732 00			
Total.....	\$2,867,063 00	\$5,379 46	\$4,998 45	\$10,377 91
SHIAWASSEE COUNTY:				
Antrim.....	\$739,500 00	\$1,479 00	\$500 00	\$1,979 00
Bennington.....	957,780 00	1,845 00	1,615 00	3,460 00
Burns.....	1,069,840 00	903 99	2,400 00	3,303 99
Caledonia.....	940,580 00	1,881 16	940 68	2,821 74
Fairfield.....	623,300 00	2,181 55		2,181 55
Hazleton.....	1,270,310 00	1,270 31	1,778 43	3,048 74
Middlebury.....	707,520 00	920 20	1,415 04	2,335 24
New Haven.....	1,021,360 00	1,021 36	1,421 36	2,442 72
Owosso.....	954,410 00	2,000 00	1,000 00	3,000 00
Perry.....	1,287,090 00	1,500 00	1,500 00	3,000 00
Rush.....	839,680 00	1,007 62	1,175 55	2,183 17
Sciota.....	1,030,370 00	1,238 84	600 00	1,838 84
Shiawassee.....	1,031,150 00	1,213 35	1,031 10	2,244 45
Venice.....	1,041,540 00	1,041 54	2,083 08	3,124 62
Vernon.....	1,855,300 00	913 50	4,210 06	5,123 56
Woodhull.....	551,045 00	1,102 09	826 57	1,928 66
Corunna City.....	659,960 00			
Owosso City.....	4,513,135 00			
Total.....	\$21,093,870 00	\$21,519 51	\$22,496 77	\$44,016 28
ST CLAIR COUNTY:				
Berlin.....	\$766,730 00	\$1,155 00	\$1,604 00	\$2,759 00
Brockway.....	493,840 00	746 50	746 50	1,493 00
Burtchville.....	224,790 00	450 00	1,000 00	1,450 00
Casco.....	752,675 00	1,877 32	752 68	2,630 00
China.....	745,975 00	898 14	1,122 67	2,020 81
Clay.....	1,543,129 00	1,786 99	464 25	2,251 24
Clyde.....	578,880 00	583 38	799 10	1,382 48
Columbus.....	619,473 00	1,548 68	1,700 00	3,248 68
Cottrellville.....	584,485 00	900 00	876 72	1,776 72
East China.....	432,895 00	865 79	2,250 00	3,115 79
Emmet.....	640,080 00	845 73	960 12	1,805 85
Fort Gratiot.....	386,445 00	579 67	193 22	772 89
Grant.....	571,575 00	1,148 12	574 65	1,722 77
Greenwood.....	656,975 00	985 50	985 50	1,971 00
Ira.....	593,270 00	646 18	900 00	1,546 18
Kenockee.....	634,945 00	952 42	634 95	1,587 37
Kimball.....	557,270 00	1,307 00	757 80	2,064 80
Lynn.....	457,150 00	955 50	2,107 50	3,063 00
Mussey.....	873,060 00	619 77	873 06	1,492 83
Port Huron.....	2,438,200 00	6,095 50	6,095 50	12,191 00
Riley.....	835,355 00	758 00	837 82	1,595 82
St. Clair.....	752,990 00	1,000 00	2,350 00	3,350 00
Wales.....	657,940 00	987 92	1,317 22	2,305 14
Marine City.....	1,432,241 00			
Port Huron City.....	10,975,320 00			
St. Clair City.....	1,384,975 00			
Yale City.....	470,280 00			
Total.....	\$31,066,943 00	\$27,693 11	\$29,903 26	\$57,596 37

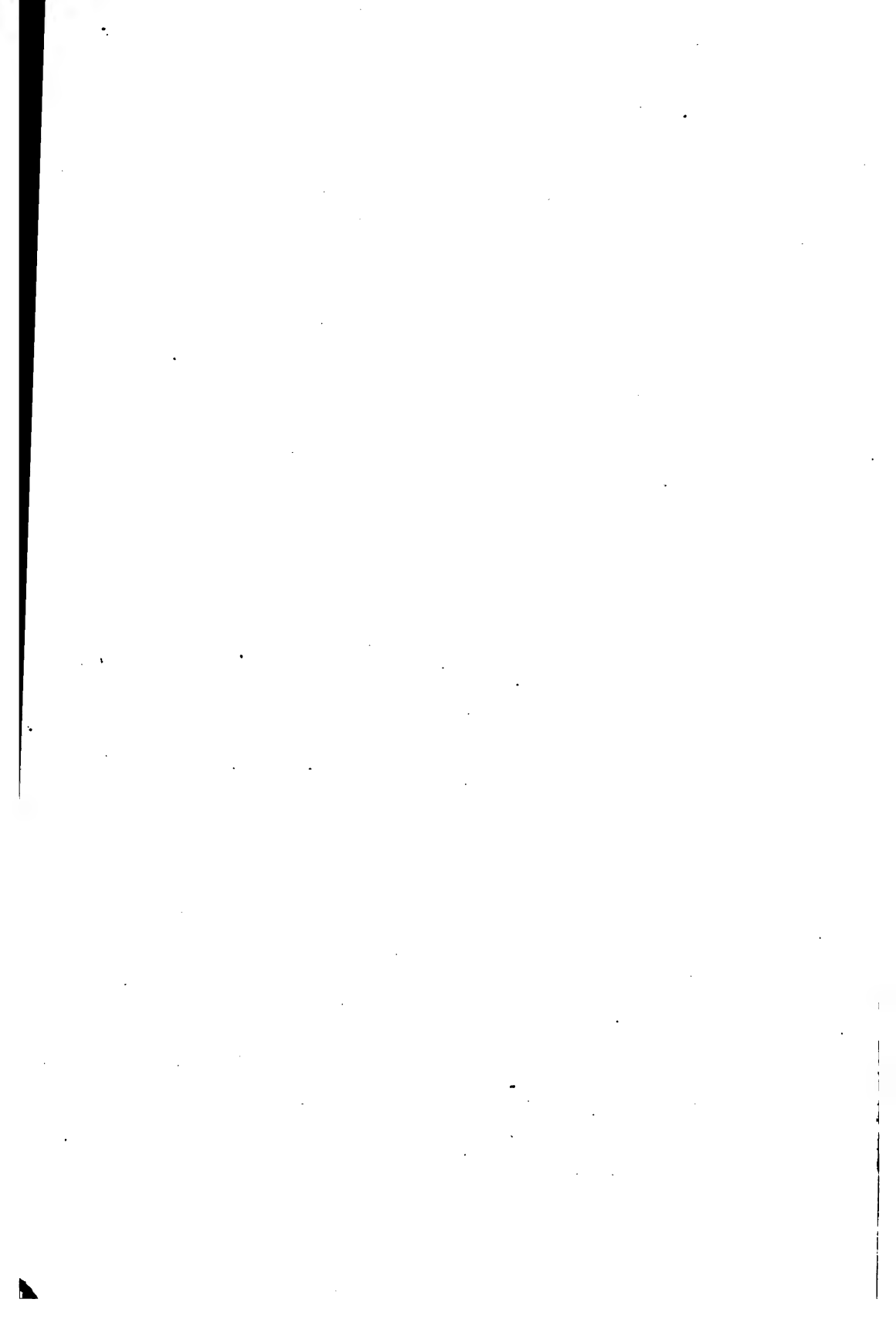
STATE HIGHWAY DEPARTMENT

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway.. improvement tax.	Total highway taxes.
JOSEPH COUNTY:				
Burr Oak.....	\$1,070,794 00	\$1,483 90	\$1,606 19	\$3,090 09
Colton.....	1,366,500 00	748 50	3,000 00	3,748 50
Constantine.....	1,449,210 00	349 00	4,098 00	4,447 00
Cabius.....	617,925 00	927 98	927 98	1,855 96
Crown River.....	474,190 00	592 75	100 00	692 75
Clarence.....	735,195 00	1,027 60		1,027 60
Clowerfield.....	602,880 00		2,860 00	2,860 00
Leonidas.....	983,855 00		983 35	983 35
Lockport.....	590,395 00	852 41	2,952 30	3,804 71
London.....	1,134,345 00	951 23	3,400 00	4,351 23
Lottville.....	404,335 00	410 00	400 00	810 00
Lottawa.....	1,224,150 00	899 87	1,224 15	2,124 02
Lark.....	620,050 00	620 05	3,000 00	3,620 05
Lherman.....	614,160 00	614 16	307 08	921 24
Lturgis.....	595,235 00	595 22		595 22
White Pigeon.....	800,835 00	283 28	800 83	1,084 11
Lturgis City.....	1,793,707 00			
Three Rivers City.....	1,918,475 00			
Total.....	\$16,996,236 00	\$10,355 95	\$25,659 88	\$36,015 83
SCOLA COUNTY:				
Akron.....	\$774,210 00	\$1,161 31	\$500 00	\$1,661 31
Almer.....	713,730 00	1,784 32	2,879 44	4,663 76
Arbela.....	441,700 00	883 00	4,699 66	4,982 66
Columbia.....	767,840 00	1,140 38	1,920 24	3,060 62
Dayton.....	454,300 00	908 60	1,300 00	2,208 60
Denmark.....	1,099,120 00	1,459 89	1,500 00	2,959 89
Elkland.....	904,700 00	927 30	2,511 70	3,439 00
Ellington.....	380,440 00	760 88	1,535 00	2,295 88
Elmwood.....	605,260 00	941 50	2,710 50	3,652 00
Fair Grove.....	892,850 00	1,455 88	1,935 70	3,391 58
Fremont.....	609,450 00	692 54	1,500 00	2,192 54
Hilford.....	543,460 00	817 57	920 19	1,737 76
Indianfields.....	1,493,350 00	1,619 22	7,813 96	9,433 18
Junata.....	573,600 00	1,150 00	1,500 00	2,650 00
Kingston.....	466,860 00	997 15	1,300 00	2,297 15
Covilton.....	442,700 00	1,028 50	1,865 00	2,893 50
Millington.....	664,090 00	702 42	2,988 40	3,690 82
Novesta.....	321,800 00	482 70	610 00	1,092 70
Nuscola.....	726,500 00	726 50	950 00	1,676 50
Nassar.....	866,130 00	500 00	2,000 00	2,500 00
Watertown.....	493,810 00	985 22	793 00	1,778 22
Nells.....	275,510 00	688 78	688 78	1,377 56
Visner.....	228,240 00	456 48	800 00	1,256 48
Total.....	\$14,739,650 00	\$22,270 14	\$44,621 57	\$66,891 71



Kalkaska county road crew at rest, their day's work done. This county has less than four million dollars assessed valuation, but what is lacking in valuation is made up in public spirit.



ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—Continued.

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	Total highway taxes.
VAN BUREN COUNTY:				
Almena.....	\$475,040 00	\$175 40	\$475 40	\$950 80
Antwerp.....	921,950 00	1,500 00	1,000 00	2,500 00
Arlington.....	810,500 00	2,300 02	2,026 25	4,326 27
Bangor.....	1,037,800 00	1,393 76	3,100 00	4,493 76
Bloomington.....	872,615 00	1,168 53	2,181 54	3,350 07
Columbia.....	449,430 00	1,000 00	2,500 00	3,500 00
Covert.....	481,525 00	1,203 81	3,003 81	4,207 62
Decatur.....	1,168,100 00	1,294 90	2,304 30	3,599 20
Geneva.....	504,950 00	1,009 70	2,546 38	3,556 08
Hamilton.....	628,880 00	1,913 64	.....	1,913 64
Hartford.....	1,208,915 00	1,434 43	3,019 73	4,454 16
Keeler.....	757,850 00	3,384 52	.....	3,384 52
Lawrence.....	929,575 00	1,373 50	4,044 65	5,418 15
Paw Paw.....	1,527,425 00	744 67	7,082 27	7,826 94
Pine Grove.....	577,455 00	1,000 00	1,000 00	2,000 00
Porter.....	718,725 00	898 41	1,535 00	2,433 41
South Haven.....	474 400 00	1,186 00	2,672 00	3,858 00
Waverly.....	617,250 00	1,234 50	1,851 75	3,086 25
South Haven City.....	1,832,903 00	.....	.....	.....
Total.....	\$15,995,288 00	\$24,515 79	\$40,343 08	\$64,858 87
WASHTENAW COUNTY:				
Ann Arbor.....	\$1,066,200 00	\$2,132 40	\$1,000 00	\$3,132 40
Augusta.....	927,500 00	1,391 25	2,226 00	3,617 25
Bridgewater.....	977,350 00	1,466 13	200 00	1,666 13
Dexter.....	550,330 00	800 00	400 00	1,200 00
Freedom.....	938,000 00	1,876 00	700 00	2,576 00
Lima.....	1,162,435 00	1,765 00	604 00	2,369 00
Lodi.....	1,170,500 00	388 29	800 00	1,188 29
Lyndon.....	451,065 00	1,127 80	575 00	1,702 80
Manchester.....	1,487,160 00	1,600 00	1,800 00	3,400 00
Northfield.....	920,400 00	920 40	1,000 00	1,920 40
Pittsfield.....	1,270,775 00	1,561 60	1,271 06	2,832 66
Salem.....	909,200 00	500 00	1,200 00	1,700 00
Saline.....	1,411,050 00	1,991 70	2,034 36	4,026 06
Scio.....	1,368,650 00	1,998 64	2,500 00	4,498 64
Sharon.....	908,970 00	1,453 45	475 00	1,928 45
Superior.....	1,052,275 00	1,293 67	1,000 00	2,293 67
Sylvan.....	1,779,820 00	1,000 00	2,000 00	3,000 00
Webster.....	954,310 00	1,432 00	650 00	2,082 00
York.....	1,584,025 00	1,012 73	3,174 55	4,187 28
Ypsilanti.....	1,274,245 00	1,850 00	2,000 00	3,850 00
Ann Arbor City.....	11,994,243 00	.....	.....	.....
Ypsilanti City.....	4,564,100 00	.....	.....	.....
Total.....	\$38,782,603 00	\$27,561 06	\$25,609 97	\$53,171 03

ASSESSED VALUATION AND HIGHWAY TAXES, 1908.—*Concluded.*

Townships.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
WAYNE COUNTY:					
Brownstown....	\$1,655,090 00	\$1,987 43	\$3,012 57	\$348 81	\$5,348 81
Canton.....	1,046,875 00	1,046 88	1,570 32	251 40	2,868 60
Dearborn.....	2,241,110 00	1,800 00	2,000 00	486 95	4,286 95
Ecorse.....	6,273,181 00	5,516 74	7,000 00	1,683 27	14,200 01
Griatiot.....	1,878,815 00	1,474 35	458 00	449 85	2,382 20
Greenfield.....	5,693,310 00	3,951 14	8,572 36	1,644 86	14,168 36
Grosse Pointe..	7,158,969 00	227 04	.....	1,771 85	1,998 89
Hamtramck.....	4,869,271 00	2,704 36	4,869 27	1,496 57	9,070 20
Huron.....	637,550 00	600 00	1,800 00	163 90	2,563 90
Livonia.....	828,195 00	414 86	3,000 00	192 65	3,607 51
Monguagon.....	2,655,530 00	3,438 35	1,080 00	570 12	5,088 47
Nankin.....	1,558,750 00	1,005 44	3,300 00	338 58	4,644 02
Northville.....	1,402,939 00	700 00	1,300 00	291 82	2,291 82
Plymouth.....	1,517,676 00	643 32	1,500 00	318 58	2,461 90
Redford.....	1,699,900 00	1,954 55	1,700 00	369 46	4,024 01
Romulus.....	792,990 00	2,378 97	1,000 00	171 98	3,550 95
Springwells.....	1,968,025 00	1,986 55	1,506 28	485 43	3,978 26
Sumpter.....	500,510 00	1,000 00	1,000 00	117 11	2,117 11
Taylor.....	775,500 00	775 00	500 00	166 55	1,441 55
Van Buren.....	1,178,850 00	1,012 20	2,019 43	262 21	3,293 84
Detroit City...	348,237,590 00	.....	.....	83,197 93	83,197 93
Wyandotte City	2,884,740 00	.....	.....	797 35	797 35
Total.....	\$397,455,366 00	\$34,617 18	\$47,188 23	\$95,577 23	\$177,382 64
WEXFORD CO:					
Antioch.....	\$379,309 00	\$1,896 50	\$1,814 82	\$520 26	\$4,231 58
Boon.....	273,960 00	300 00	1,369 80	407 78	2,077 58
Cedar Creek...	508,593 00	1,008 69	2,807 42	703 06	4,519 17
Cherry Grove...	106,000 00	700 00	700 00	168 75	1,568 75
Clam Lake.....	198,745 00	945 00	945 00	351 53	2,241 53
Colfax.....	193,540 00	955 00	1,876 76	421 83	3,253 59
Greenwood.....	156,910 00	784 60	784 60	154 67	1,723 87
Hanover.....	251,875 00	673 47	1,259 38	337 66	2,270 51
Harring.....	118,285 00	298 25	298 25	154 67	751 17
Henderson.....	179,020 00	895 10	895 10	253 10	2,043 30
Liberty.....	114,610 00	573 05	573 05	154 67	1,300 77
Selma.....	142,200 00	706 10	706 10	267 16	1,679 36
Slagle.....	194,225 00	784 75	841 25	224 96	1,850 96
South Branch...	160,150 00	671 07	1,871 07	196 86	2,739 00
Springville.....	237,560 00	895 10	2,487 80	421 83	3,804 73
Wexford.....	336,300 00	763 63	504 45	492 14	1,760 22
Cadillac City...	\$3,671,725 00	.....	.....	4,921 48	4,921 48
Total.....	\$7,222,987 00	\$12,850 31	\$19,734 85	\$10,152 41	\$42,737 57

RECAPITULATION BY COUNTIES.

County.	Assessed valuation	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
Alcona.....	\$1,091,092 00	\$3,831 91	\$4,462 49		\$8,294 40
Alger.....	3,968,437 00	8,025 49	13,678 81		21,702 30
Allegan.....	21,957,327 00	30,681 28	57,373 13		88,054 41
Alpena.....	7,686,598 00	7,478 51	5,818 91	\$15,372 16	28,669 58
Antrim.....	5,460,251 00	10,033 21	22,180 15		32,213 36
Arenac.....	1,994,081 00	4,686 37	12,406 32		17,092 69
Baraga.....	3,141,800 00	11,630 30	11,382 02	6,001 15	29,013 47
Barry.....	14,139,158 00	14,526 58	14,769 44		29,296 02
Bay.....	25,728,420 00	9,591 80	14,772 90	50,235 68	74,600 38
Benzie.....	3,204,033 00	7,796 05	10,601 21		18,397 26
Berrien.....	26,712,408 00	28,978 34	41,978 52		70,956 86
Branch.....	19,782,560 00	20,808 52	21,841 29		42,649 81
Calhoun.....	41,816,460 00	23,682 11	16,178 53		39,860 64
Cass.....	14,145,446 00	12,898 57	10,828 82		23,727 39
Charlevoix.....	6,039,908 00	8,310 65	15,549 18		23,859 83
Cheboygan.....	6,599,120 00	14,883 00	20,989 36	13,589 81	49,462 17
Chippewa.....	12,350,866 00	11,365 47	8,951 66	23,038 70	43,355 83
Clare.....	2,097,467 00	5,057 65	† 8,499 37		13,557 02
Clinton.....	20,604,920 00	26,816 75	23,732 63		50,549 38
Crawford.....	1,630,005 00	3,089 73	5,504 57		8,594 30
Delta.....	9,174,216 00	11,979 03	20,460 24	19,088 42	51,527 69
Dickinson.....	10,378,319 00	9,195 56	13,898 16	20,893 65	43,987 37
Eaton.....	22,408,975 00	22,222 21	21,413 93		43,636 14
Emmet.....	8,158,202 00	11,539 46	12,731 32	12,196 44	36,467 22
Genesee.....	31,943,014 00	24,104 37	25,114 96		49,219 33
Gladwin.....	1,991,198 00	5,784 15	9,024 97	4,056 76	18,865 88
Gogebic.....	10,726,249 00	15,181 12	19,345 66		34,526 78
Grand Traverse.....	8,907,195 00	9,267 27	9,558 60		18,825 87
Gratiot.....	14,635,238 00	17,078 15	27,164 07	* 6,666 30	50,908 52
Hillsdale.....	21,732,402 00	24,490 55	24,008 48		48,499 03
Houghton.....	90,224,393 00	27,586 26	19,508 48		47,094 74
Huron.....	14,240,842 00	21,671 80	35,594 28		57,266 08
Ingham.....	28,814,260 00	20,729 54	16,719 94		37,449 48
Ionia.....	21,043,305 00	22,424 76	27,507 20		49,931 96
Iosco.....	1,433,660 00	4,303 79	5,629 92	3,539 02	13,472 73
Iron.....	4,898,471 00	8,246 09	12,196 86	9,933 67	30,376 62
Isabella.....	9,680,895 00	13,543 75	20,488 32		34,032 07
Jackson.....	33,687,605 00	22,252 04	17,063 71		39,315 75
Kalamazoo.....	35,455,468 00	16,981 23	18,808 26		35,789 49
Kalkaska.....	3,271,178 00	7,799 51	10,669 97	10,164 34	28,633 82
Kent.....	105,113,404 00	38,912 79	46,346 64	* 24,566 05	109,825 48
Keweenaw.....	7,238,422 00	22,401 38			22,401 38
Lake.....	1,215,318 00	3,906 63	6,248 92		10,155 55
Lapeer.....	16,052,940 00	18,589 31	23,303 12		41,892 43
Leelanau.....	2,141,741 00	6,580 03	6,883 69		13,463 72
Lenawee.....	38,863,388 00	28,012 74	53,367 82		81,380 56
Livingston.....	15,593,205 00	17,746 04	19,004 33		36,750 37
Luce.....	2,316,580 00	4,804 21	6,333 82	4,598 17	15,736 20
Mackinac.....	3,339,817 00	6,739 96	12,331 21		19,071 17
Macomb.....	26,805,235 00	20,657 04	35,044 26		55,701 30
Manistee.....	9,799,143 00	7,761 61	14,929 80	19,468 35	42,159 76
Marquette.....	25,475,718 00	18,032 70	14,007 90	29,999 57	62,040 17
Mason.....	6,934,380 00	9,390 14	9,669 38	20,367 05	39,426 57
Mecosta.....	4,992,726 00	12,439 06	14,025 12	9,875 42	36,339 60
Menominee.....	10,535,396 00	14,320 11	21,889 97	21,368 00	57,578 08
Midland.....	4,605,642 00	8,132 44	24,147 84		32,280 28
Missaukee.....	2,133,287 00	6,013 63	12,052 66	2,182 69	20,248 98
Monroe.....	19,997,605 00	16,914 90	33,627 33		50,542 23
Montcalm.....	11,374,810 00	18,715 08	21,947 83		40,663 91
Montmorency.....	1,060,091 00	4,588 76	3,657 67		8,246 43

STATE HIGHWAY DEPARTMENT

RECAPITULATION BY COUNTIES.—*Concluded.*

County.	Assessed valuation.	Road repair tax.	Highway improvement tax.	County road tax.	Total highway taxes.
Muskegon.....	\$16,846,377 00	\$11,624 61	\$16,929 18	\$49,962 67	\$78,516 46
Newaygo.....	5,883,849 00	12,916 82	27,258 71	.....	40,175 53
Oakland.....	35,931,125 00	28,844 34	24,718 13	.....	53,562 47
Oceana.....	4,838,895 00	12,448 57	† 31,066 43	.....	43,515 00
Ogemaw.....	2,288,353 00	6,149 76	7,622 57	.....	13,772 33
Ontonagon.....	4,447,345 00	17,519 70	35,774 71	.....	53,294 41
Osceola.....	4,566,421 00	11,370 00	18,535 50	.....	29,905 50
Oscoda.....	973,070 00	2,252 80	2,352 80	† 1,000 00	5,605 60
Otsego.....	2,849,756 00	6,213 99	10,410 35	.....	16,624 34
Ottawa.....	24,561,493 00	27,547 39	44,134 62	.....	71,682 01
Presque Isle....	3,072,500 00	5,561 25	9,501 35	.....	15,062 60
Roscommon.....	1,443,687 00	3,719 31	4,999 89	.....	8,719 20
Saginaw.....	41,116,267 00	19,801 54	42,919 12	76,791 09	139,511 75
Sanilac.....	13,939,030 00	23,156 00	39,911 84	.....	63,067 84
Schoolcraft.....	2,867,063 00	5,379 46	4,998 45	.....	10,377 91
Shiawassee.....	21,093,870 00	21,519 51	22,496 77	.....	44,016 28
St. Clair.....	31,066,943 00	27,693 11	29,903 26	.....	57,596 37
St. Joseph.....	16,996,236 00	10,355 95	25,659 88	.....	36,015 83
Tuscola.....	14,739,650 00	22,270 14	44,621 57	.....	66,891 71
Van Buren.....	15,995,288 00	24,515 79	40,343 08	.....	64,858 87
Washtenaw.....	38,782,603 00	27,561 06	25,609 97	.....	53,171 03
Wayne.....	397,455,366 00	34,617 18	47,188 23	95,577 23	177,382 64
Wexford.....	7,222,987 00	12,850 31	19,734 85	10,152 41	42,737 57
Total.....	\$1,648,671,411 00	\$1,240,878 08	\$2,452,541 80	\$529,452 45	\$29,689,332 26

* Townships under county-township road plan, or in good roads districts.

† Includes townships under county-township road plan.

‡ County bridge tax.



Grading roads in Kalkaska county.



A state reward macadam road in Kalkaska county. Built of crushed cobblestone by county road commission.

COUNTY AND TOWNSHIP
HIGHWAY COMMISSIONERS.

COUNTY ROAD COMMISSIONERS.

ALGER COUNTY.

Alfred O. Jopling, Munising.
Charles B. Beaulien, Grand Marais.
Swan Anderson, Limestone.

ALPENA COUNTY.

George W. Stovel, Hubbard Lake.
Selden W. Flanders, Flanders.
James Briselden, Alpena.

BARAGA COUNTY.

Simon Denomie, Assinins.
Daniel McMillan, Baraga.
James McKircher, Michigamme.

BAY COUNTY.

Hugh Campbell, Bay City.
Clarence B. Chatfield, Bay City.
Richard H. Fletcher, Bay City.
Fred Kaiser, Kawkawlin.
Henry B. Lints, Linwood.

BENZIE COUNTY.

Samuel Willis, Thompsonville.
A. J. Spaulding, Benzonia, R. F. D.

CHEBOYGAN COUNTY.

John B. McArthur, Cheboygan.
Royal J. Taylor, Cheboygan.
Mark P. Scott, Rondo.

CHIPPEWA COUNTY.

Henry A. Osborn, Sault Ste. Marie.

DELTA COUNTY.

John Gasman, Bark River.
Erick Anderson, Escanaba.
Bazilio Lenzi, Escanaba.

DICKINSON COUNTY.

William Kelly, Vulcan.
John J. Flanagan, Sagola.
Edward G. Kingsford, Iron Mountain.

EMMET COUNTY.

Frank Voorheis, Harbor Springs.
Clifford Buys, Levering.

GLADWIN COUNTY.

Wallace McCracken, Gladwin, R. F. D. 1.
W. H. McCulloch, Gladwin, R. F. D. 3.
Arden G. Onweller, Beaverton, R. F. D. 1.

IOSCO COUNTY.

John M. Waterbury, Tawas City.
C. W. Luce, East Tawas.
Wm. J. Grant, Au Sable.

IRON COUNTY.

John H. Parks, Crystal Falls.
W. H. Jobe, Palatka.
James Long, Iron River.

KALKASKA COUNTY.

Louis A. Atkins, Lodi.
Ira Eckler, Kalkaska.
Wm. H. Marshall, Leetsville.

LUCE COUNTY.

Andrew Carlson, Newberry.
John Fyvie, Helmer.
Richard Hall, Newberry.

MANISTEE COUNTY.

John W. Bradford, Arcadia.
James Henderson, Manistee.

MARQUETTE COUNTY.

W. H. Johnston, Ishpeming.
M. M. Duncan, Ishpeming.
J. E. Sherman, Marquette.

MASON COUNTY.

Frank W. Harding, Scottville.
Robert Jameson, Ludington.

MECOSTA COUNTY.

Willard B. Lyons, Big Rapids.
Wilbur A. Reynolds, Remus.
Charles Ostrander, Morley, R. F. D. 1.

MENOMINEE COUNTY.

George H. Haggerson, Menominee.
George Law, Menominee.
Louis Nadeau, Nadeau.

MISSAUKEE COUNTY.

C. C. Crane, Pioneer.
Abram Lucas, Lucas.

MUSKEGON COUNTY.

Fred D. Hoogstraat, Ravenna.
Charles Ellis, Muskegon, R. F. D. 7.
Martin Ryerson, Holton.

OCEANA COUNTY.

George C. Myers, Shelby, R. F. D.
Claude E. Jones, Hart, R. F. D.
Howell E. Sumner, Ferry.

SAGINAW COUNTY.

Alpheus Green, Saginaw, W. S.

WAYNE COUNTY.

Edward N. Hines, Detroit.
Wm. Murdock, Wayne.
J. S. Haggerty, Detroit.

WEXFORD COUNTY.

Charles E. Haynes, Cadillac.
Fred Usewick, Mesick.
T. E. Standclift, Boon.

Saugatuck.....	Peter Lackie.....	No.....	Douglas*.....	Douglas*.....
Trowbridge.....	Will H. McCarn.....	No.....	Allegan, R. D. 3.....	Allegan, R. D. 3*.....
Valley.....	Abner H. Estabrook.....	No.....	Allegan, R. D. 8*.....	Allegan, R. D. 8*.....
Watson.....	Geo. R. Bentley.....	No.....	Allegan, R. D. 2.....	Allegan, R. D. 2*.....
Wayland.....	Spencer Welsh.....	Yes.....	Bradley, R. D. 1*.....	Bradley, R. D. 1*.....
ALPENA COUNTY:				
Alpena.....	John Cronk.....	Yes.....	Alpena.....	Alpena*.....
Green.....	Harmon Cook.....	Yes.....	Dafoe, R. D. 2.....	Dafoe, R. D. 2, Box 28*.....
Long Rapids.....	Edgar Thorne.....	Yes.....	Leer, R. D. 1.....	Leer, R. D. 1.....
Maple Ridge.....	William Ferris.....	No.....	Cathro*.....	Cathro*.....
Ossineke.....	Thomas W. Robb.....	Yes.....	Hubbard Lake.....	Hubbard Lake*.....
Sanborn.....	F. C. Pechett.....	No.....	Ossineke.....	Ossineke, R. D. 1.....
Wilson.....	James Bryce.....	No.....	Alpena, R. D. 2.....	Dafoe, R. D. 1, Box 46.....
ANTRIM COUNTY:				
Banks.....	William P. Smith.....	Yes.....	Central Lake, R. D. 2.....	Ellsworth.....
Central Lake.....	John C. Smith.....	Yes.....	Central Lake*.....	Central Lake*.....
Chestonia.....	Wm. Schroeder.....	Yes.....	Alba*.....	Alba*.....
Gustar.....	John Walker.....	Yes.....	Mancelona*.....	Mancelona*.....
Elk Rapids.....	William Kidder.....	No.....	East Jordan.....	East Jordan, R. D. 3.....
Forest Home.....	Wellington C. Curry.....	Yes.....	Elk Rapids.....	Elk Rapids*.....
Helena.....	Frederick S. Wright.....	Yes.....	Bellaire.....	Bellaire.....
Jordan.....	Emery Rose.....	No.....	Alden.....	Alden.....
Kearney.....	Fred E. Sweet.....	Yes.....	Chestonia.....	East Jordan, R. D. 5*.....
Mancelona.....	John J. Montgomery.....	Yes.....	Bellaire, R. D. 3*.....	Bellaire, R. D. 3*.....
Milton.....	Mason Austin.....	Yes.....	Mancelona*.....	Mancelona, Box 63*.....
Star.....	Wm. L. Hubbell.....	No.....	Kewadin.....	Kewadin*.....
Torch Lake.....	John Johnson.....	No.....	Alba.....	Alba.....
Warner.....	Raymond Wilkinson.....	Yes.....	Eastport.....	Torch Lake.....
	Van E. Evans.....	Yes.....	Elmira*.....	Elmira*.....
ARENAC COUNTY:				
Adams.....	Walter McTaggart.....	Yes.....	Sterling.....	Sterling, R. D. 2.....
Arenac.....	Herbert V. Stone.....	No.....	Standish.....	Standish, R. D. 1.....
Au Gres.....	Will Bow.....	No.....	Au Gres, R. D. 2, Box 22*.....	Au Gres, R. D. 2, Box 22*.....
Clayton.....	John Donnelly.....	Yes.....	Sterling, R. D. 1*.....	Sterling, R. D. 1*.....
Deep River.....	Joel Laiz.....	Yes.....	Sterling*.....	Sterling*.....
Lincoln.....	William Logan.....	Yes.....	Standish*.....	Standish, R. D. 1.....
Mason.....	Jas. Bruce.....	No.....	Twining, R. D. 1.....	Twining, R. D. 1*.....
Moffitt.....	R. J. Dunn.....	Yes.....	Alger*.....	Alger*.....
Standish.....	Edmond T. Volker.....	No.....	Pinconning, R. D. 3.....	Pinconning, R. D. 3.....
Turner.....	Benj. Trombly.....	Yes.....	Turner*.....	Turner*.....
Whitney.....	James E. Cook.....	No.....	Au Gres.....	Au Gres.....
BARAGA COUNTY:				
Arvon.....	Peter Rehn.....	Yes.....	Skaneec.....	Skaneec*.....
Baraga.....	Charles Walburn.....	Yes.....	Baraga.....	Baraga.....
Covington.....	Joseph Miettunen.....	Yes.....	Covington.....	Covington.....
L'Anse.....	Eugene Cote.....	Yes.....	L'Anse*.....	L'Anse*.....
Spuit.....	Gilbert Olson.....	No.....	Michigamme*.....	Michigamme.....

TOWNSHIP HIGHWAY COMMISSIONERS.—Continued.

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner	Post Office Address.
CLARE COUNTY.—Con.	Charles Palmer.....	Harrison, R. D. 7.	1	Yes.	Charles Palmer.....	Harrison, R. D. 1.*
	William Mott.....	Farwell.*	3	Yes.	William Mott.....	Farwell.*
	John D. Davis.....	Marion, R. D. 2.	1	Yes.	John D. Davis.....	Marion, R. D. 2.*
	Cleander J. Chapman.....	Bath.	1	Yes.	E. A. Clise.....	Bath.
	C. E. Smith.....	St. Johns, R. D. 2.	No.	No.	Miner Sutton.....	St. Johns, R. D. 3.
CLINTON COUNTY:	Bengal.....	St. Johns, R. D. 28.	12	Yes.	Ross B. Brooks.....	St. Johns, R. D. 3.
	Bingham.....	Charles Faniel.....	2	Yes.	William Dunnebacke.....	Fowler.
	Dallas.....	De Witt.....	6	Yes.	Oliver S. Angell.....	Lansing, R. D. 7.*
	Du Plain.....	Thomas Peck.....	3	Yes.	Thomas Peck.....	Elsie.*
	Eagle.....	W. H. Holmes.....	6	No.	William L. Tullman.....	Eagle.
	Essex.....	James Lambie.....	1	Yes.	James Lambie.....	Maple Rapids.*
	Greenbush.....	Grand Ledger, R. D. 2*.	3	Yes.	St. Johns, R. D. 39.	St. Johns, R. D. 39.
	Lebanon.....	St. Johns, R. D. 8*.	2	Yes.	Lewis F. Gilson.....	Matherton.*
	Oliver.....	Matherton.*	1	Yes.	Ira M. Knapp.....	Merle Beach, R. D. 13.*
	Olive.....	St. Johns, R. D.*	5	Yes.	James A. Dean.....	St. Johns, R. D. 7.*
	Riley.....	De Witt, R. D. 27.	1	Yes.	Henry H. Stevens.....	Merle Beach, R. D. 13.
	Victor.....	Lansburg, R. D. 3.*	9	Yes.	William Dowding.....	Lansburg, R. D. 3.*
	Watertown.....	De Witt, R. D. 28*.	3	Yes.	Sidney Felton.....	Lansing, R. D. 4.
	Westphalia.....	Westphalia, R. D. 1, Box 32*.	3	Yes.	Jos. Platte.....	Westphalia.*
CRAWFORD COUNTY:	Geo. W. Brott.....	Wellington.....	1	Yes.	John B. Carter.....	Rosecommon.
	Beaver Creek.....	Frederic.*	3	Yes.	C. S. Barber.....	Frederic.*
	Frederic.....	Graveling.*	4	Yes.	C. P. Robinson.....	Graveling.*
	Graveling.....	Judge.....	3	Yes.	William G. Feldhauser.....	Frederic.
	Maple Forest.....	Jackpine.	3	Yes.	Frank Gregory.....	Rosecommon.
DELTA COUNTY:	Geo. M. Cook.....	Perkins.....			Erick Carlson.....	Perkins.
	Fred Le Bresh.....	Schaffer.*			Henry Nelson.....	Schaffer.
	Baldwin.....	Andrew Hanson.....			Andrew Hanson.....	Stonington.*
	Bark River.....	Stonington.*			Joel Lamborg.....	Gladstone.
	Bay de Noc.....	Kipling.....			John Duncan.....	Woodlawn.
	Brampton.....	Cornell.....			Henry Robertia.....	Groos.*
	Cornell.....	Groos.....			Julius Eggert.....	Fayette.
	Escanaba.....	Fayette.*			Stephen Pesenki.....	Hyde.
	Fairbanks.....	Conrad Dalgard.....			Edward Disco.....	Garden.
	Ford River.....	Andrew Englund.....			Napoleon J. Trombly.....	Rock.*
	Garden.....	Phillip Plant.....			John Wickstrom.....	Rapid River.*
	Maple Ridge.....	Napoleon J. Trombly.....			Andrew Johnson.....	Oreola.*
	Mapleville.....	John Wickstrom.....			Chas. H. Walker.....	Hyde.*
	Nahma.....	Oreola.*				
	Wells.....	Hyde.....				

DICKINSON COUNTY:

Breen.....
Breitung.....
Fitch.....
Norway.....
Segala.....
Waucesdal.....
W. J. McLaughlin.....

Hardwood.....
Quinnesc.....
Metropolitan.....
Vulcan.....
Loretto.....

EATON COUNTY:

Bellevue.....
Beaton.....
Brookfield.....
Carmel.....
Chester.....
Delta.....
Eaton.....
Eaton Rapids.....
Hamlin.....
Kalama.....
Oreida.....
Roxand.....
Sunfield.....
Vernontville.....
Walton.....
Windsor.....

Bellevue, Box 455*.....
Charlotte*.....
Olivet, R. D. 4*.....
Charlotte, R. D. 10*.....
Charlotte, R. D. 11*.....
Delta*.....
Charlotte, R. D. 3*.....
Porterville.....
Eaton Rapids.....
Vernontville, R. D. 2*.....
Grand Ledge, R. D. 6*.....
Sunfield, R. D. 1*.....
Woodbury, R. D. 1.....
Vernontville*.....
Olivet, R. D. 2.....
Dimondale*.....

Henry Charlebois.....
John McLellan.....
Andrew M. Wickman.....
Henry Girard.....
Thomas L. Cary.....
Warren J. McLaughlin.....

Bellevue.....
Charlotte*.....
Olivet, R. D. 4*.....
Charlotte, R. D. 1.....
Lansing, R. D. 6.....
Charlotte, R. D. 3*.....
Eaton Rapids.....
Eaton Rapids, R. D. 2*.....
Bellevue, R. D. 2.....
Grand Ledge, R. D. 6*.....
Mulliken.....
Sunfield.....
Vernontville.....
Charlotte.....
Dimondale.....

EMMET COUNTY:

Bear Creek.....
Bliss.....
Carp Lake.....
Center.....
Friendship.....
Littlefield.....
Little Traverse.....
Maple River.....
McKinley.....
Pleasant View.....
Readmond.....
Resort.....
Springvale.....
West Traverse.....

Petoskey, R. D. 2.....
Carp Lake*.....
Ely.....
Cross Village*.....
Harbor Springs, R. D. 1*.....
Alanson*.....
Harbor Springs*.....
Brutus.....
Van.....
Good Hart*.....
Harbor Springs*.....
Petoskey, R. D. 1.....
Springvale.....
Harbor Springs.....

Charles W. Lempke.....
William Mallory.....
Neil McDonald.....
Simon Lark.....
Harvey Owens.....
William B. Gohtry.....
Stephen P. Williams.....
John H. Cosens.....
John Wurst.....
John Quinlan.....
Charles Churchill.....
Albert Taylor.....
Alfred Hayes.....
George Frederickson.....
Willard Hunt.....

Petoskey.....
Levering, R. D. 1.....
Levering.....
Larks.....
Cross Village*.....
Harbor Springs.....
Alanson.....
Harbor Springs*.....
Brutus.....
Pellston.....
Harbor Springs, R. D. 2.....
Cross Village.....
Petoskey, R. D. 1, Box 45.....
Springvale*.....
Harbor Springs*.....

GENESSEE COUNTY:

Argentine.....
Atlas.....
Burton.....
Clayton.....
Davison.....
Penton.....
Flint.....
Flint.....
Forest.....
Gaines.....

Byron, R. D. 2.....
Goodrich*.....
Flint, R. D. 2.....
Flushing.....
Davison*.....
Linden*.....
Flint.....
Flint.....
Flushing*.....
Otsville*.....
Duffield*.....

Jentha Skinner.....
Calvin L. Rhodes.....
David Bush.....
George A. Sanders.....
William Dillenbeck.....
H. H. Williams.....
Charles W. Minto.....
Samuel W. Bacon.....
B. P. Doolittle.....
Arthur G. Carrier.....

Byron, R. D. 1*.....
Goodrich.....
Flint, R. D. 2*.....
Flushing, R. D. 3.....
Davison*.....
Linden*.....
Flint, R. D. 5*.....
Flushing, R. D. 2*.....
Otsville.....
Duffield*.....

STATE HIGHWAY DEPARTMENT

TOWNSHIP HIGHWAY COMMISSIONERS.—Continued.

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner	Post Office Address.
GENESEE COUNTY.—Con.						
Genesee.....	James Clark.....	Flint, R. D. 3.....	1	Yes.....	James H. Clark.....	Flint.*
Grand Blanc.....	L. Roy Perry.....	Grand Blanc*.....	3	No.....	George Meade.....	Grand Blanc.
Montrose.....	Richard Eckles.....	Montrose.....	3	Yes.....	Richard Eckles.....	Montrose, R. D. *
Mt. Morris.....	John R. Eagan.....	Mt. Morris.....	3	No.....	John Dolan.....	Mt. Morris, R. D. 2.
Mundy.....	H. B. Young.....	Swartz Creek*.....	3	Yes.....	H. B. Young.....	Swartz Creek, R. D. *
Richfield.....	Ira Dickerson.....	Mt. Morris.....	5	No.....	Chas. Sliker.....	Rogersville.
Thetford.....	Albert J. Holden.....	Clio, R. D. 4*.....	4	Yes.....	Albert J. Holden.....	Clio, R. D. *
Vienna.....	Harvey D. Griswold.....	Clio*.....	4	Yes.....	Harvey D. Griswold.....	Clio.*
GLADWIN COUNTY:						
Beaverton.....	Peter Uhl.....	Beaverton.....	1	Yes.....	Albert B. Marble.....	Beaverton.
Bentley.....	D. S. Streeter.....	Estey.....	1	Yes.....	D. S. Streeter.....	Estey.*
Billings.....	Albert H. Smith.....	Billings*.....	2	No.....	Jno. W. Carter.....	Billings.
Bouquet.....	Lewis Hurrell.....	Alger, R. D. 1*.....	3	Yes.....	H. L. Oliver.....	Alger, R. D. 1.*
Buckeye.....	H. L. Oliver.....	Arbutus.....	1	No.....	Jesse Hollenbeck.....	Arbutus.*
Butman.....	Jesse Hollenbeck.....	Gladwin.....	3	Yes.....	Jerry Gayette.....	Gladwin.*
Clement.....	Joseph Fournier.....	Alger, R. D. 1.....	1	Yes.....	George Greer.....	Alger, R. D. 1.
Gladwin.....	Charles A. Neason.....	Gladwin, R. D. 1.....	3	No.....	Chas. W. Baumgardner.....	Gladwin.
Grout.....	George Booth.....	Bard.....	3	No.....	George Greer.....	Gladwin, R. D. 3.
Sage.....	Oscar R. Dow.....	Gladwin, R. D. 1*.....	1	Yes.....	Irving E. Foutch.....	Gladwin.
Sherman.....	John Sharkey.....	Butman.....	3	No.....	John Sharkey.....	Butman.*
Tobacco.....	Wilbur C. Deming.....	Beaverton, R. D. 1.....	1	Yes.....	Elmer Quellet.....	Beaverton.
GOCEBIC COUNTY:						
Bessemer.....	John St. John.....	Bessemer.....	7	Yes.....	John Mattison.....	Ironwood, Box 733.
Ironwood.....	Thomas Saari.....	935 Newport St., Ironwood.....	2	Yes.....	John Leppanen.....	Montreal.
Marenisco.....	Isaac Roseburg.....	Marenisco*.....	5	Yes.....	Isaac Roseberg.....	Marenisco.*
Wakefield.....	Jacob Ullila.....	Wakefield*.....	1	Yes.....	Matt Lahli.....	Wakefield.
Watersmeet.....	Nicholas Kolinski.....	Watersmeet*.....	3	Yes.....	Nicholas Kolinski.....	Watersmeet.*
GRAND TRAVERSE CO.						
Acme.....	C. H. Estes.....	Bates.....	7	Yes.....	Ezra Wethly.....	Acme.
Blair.....	C. M. Watson.....	Monroe Center*.....	2	Yes.....	Frank Sawyer.....	Traverse City, RD 6, B 49
East Bay.....	Henry E. Carlisle.....	Traverse City, R. D. 4*.....	5	Yes.....	William T. Elkey.....	Traverse City, R. D. 4.
Fife Lake.....	George M. Weaver.....	Fife Lake.....	1	Yes.....	John Price.....	Kingsley, City.*
Gladwin.....	Florence Anthony.....	Traverse City, Box 292*.....	3	Yes.....	Florence Anthony.....	Traverse City.*
Grant.....	Chas. Reinert.....	Nessen City.....	3	No.....	Chas. Reinert.....	Nessen City.*
Green Lake.....	Tapp Hartline.....	Pendon, R. D. 1.....	3	No.....	Tapp Hartline.....	Pendon, R. D. 1.*
Long Lake.....	Fred Kingdon.....	Traverse City, R. D. 2*.....	3	Yes.....	J. G. Rehl.....	Traverse City, R. D. 2.*
Mayfield.....	Irvine Corning.....	Buckley.....	3	No.....	Irvine Corning.....	Buckley, R. D. 1.*
Paradise.....	John Brown.....	Summit City*.....	3	Yes.....	John A. Brown.....	Summit City.*
Peninsula.....	Daniel H. McMullen.....	Traverse City, R. D. 1*.....	4	Yes.....	Daniel H. McMullen.....	Traverse City, R. D. 1.*

Union.....	C. H. Peck.....	Fife Lake R. D.	9	Yes.....	Augustus T. Clark.....	Fife Lake Williamsburg, R. D.
Whitewater.....	W. H. Ayers.....	Williamsburg*.....	2	Yes.....	W. A. Worden.....	
GRATIOT COUNTY:						
Aracata.....	Fred Church.....	Alma, R. D. 3*.....	3	Yes.....	Fred Church.....	Alma*.....
Bethany.....	Oscar Wolf.....	St. Louis, R. D. 3*.....	2	Yes.....	Franklin P. Shook.....	St. Louis, R. D. 5.....
Etha.....	M. L. Lewis.....	Barnister, R. D. 2.....	8	Yes.....	Martin Z. Lewis.....	Barnister*.....
Emerson.....	Walter Whitton.....	Ithaca, R. D. 7.....	3	Yes.....	Walter Whitton.....	Ithaca, R. D. 7*.....
Fulton.....	M. J. Smith.....	Pompeii, Box 57.....	2	Yes.....	William Shuler.....	Pompeii, Box 57*.....
Hannan.....	M. W. Siedman.....	North Star, R. D. 2.....	1	Yes.....	M. N. Siedman.....	North Star, R. D. 2*.....
Ithaca.....	L. T. Depue.....	Ithaca*.....	4	Yes.....	L. T. Depue.....	Ithaca*.....
Lafayette.....	Rolla J. Peet.....	Breckenridge, R. D. 2*.....	2	Yes.....	Albion W. Elder.....	Breckenridge, R. D. 3.....
Newark.....	Warren J. Knowlton.....	Ithaca, R. D. 8.....	1	Yes.....	Donald B. MacLaren.....	Ithaca, R. D. 1.....
New Haven.....	Daniel Wright.....	Maple Rapids.....	2	Yes.....	Daniel Wright.....	Maple Rapids.....
North Star.....	C. E. Smith.....	Ithaca, R. D. 4*.....	1	No.....	C. E. Smith.....	Ithaca, R. D. 4*.....
Pine River.....	Isaac Church.....	Elwell, R. D. 2*.....	2	No.....	Henry M. Miller.....	Alma, R. D. 2*.....
Serville.....	Henry M. Miller.....	Elwell, R. D. 2*.....	2	Yes.....	Frank E. Clapper.....	Elwell, R. D. 2*.....
Summer.....	Arthur E. Fowler.....	Summer*.....	10	Yes.....	L. S. Reiss.....	Ashley, R. D. 3*.....
Washington.....	Epiphany Reel.....	Ashley*.....	10	Yes.....	Newell M. Bradford.....	Wheeler*.....
Wheeler.....	Newell Bradford.....	Wheeler*.....	10	No.....		
HILLSDALE COUNTY:						
Adams.....	William S. Van Wert.....	Osseo*.....	4	Yes.....	William S. Van Wert.....	Osseo*.....
Allen.....	Charles H. Meredith.....	Allen*.....	5	Yes.....	Charles H. Meredith.....	Allen*.....
Amboy.....	Jehude Drake.....	Frontier, R. D. 46.....	1	Yes.....	L. D. Sheldon.....	Camden.....
Cambria.....	A. M. Keas.....	Hillsdale, R. D. 4*.....	2	Yes.....	W. L. Kelley.....	Hillsdale, R. D. 6.....
Camden.....	Fred M. Wigent.....	Camden*.....	2	No.....	Fred M. Wigent.....	Camden*.....
Fayette.....	C. V. Burnett.....	Jonesville.....	3	Yes.....	C. V. Burnett.....	Jonesville*.....
Hillsdale.....	Geo. Forties.....	Hillsdale, R. D. 5.....	1	Yes.....	George W. Forties.....	Hillsdale, R. D. 5*.....
Jefferson.....	John H. Randall.....	Pittsford.....	1	Yes.....	Robert Cousins.....	Pittsford*.....
Litchfield.....	Scott C. Parker.....	Litchfield*.....	3	Yes.....	Scott C. Parker.....	Litchfield.....
Moscow.....	William B. Ballard.....	Moscow*.....	2	Yes.....	Charles E. Boornem.....	Moscow*.....
Pittsford.....	John H. Miller.....	Prattville.....	3	No.....	Edward D. Silvers.....	Pittsford.....
Ransom.....	R. W. Miller.....	Reading.....	1	No.....	Joseph Wayman.....	Pittsford, R. D.....
Reading.....	Frank Holcomb.....	Jonesville*.....	3	Yes.....	Frank Holcomb.....	Reading*.....
Scipio.....	Orlando P. Foster.....	Reading*.....	1	Yes.....	Alanson W. Hoag.....	Mosherville.....
Somerseset.....	Wm. Mills.....	Pittsford, R. D. 31.....	10	Yes.....	Henry B. Harper.....	Somerseset.....
Woodbridge.....	William Saltgaber.....	Reading, R. D. 17*.....	10	Yes.....	Alvin B. Combs.....	Pittsford, R. D. 31*.....
Wright.....		Prattville.....	2	Yes.....	Frank Carpenter.....	Frontier.....
					G. A. Moore.....	Waldron.....
HOUGHTON COUNTY:						
Adams.....	Michael Messner.....	Atlantic Mine.....			Michael Messner.....	Atlantic Mine*.....
Calumet.....	Paul B. Roehm.....	Calumet*.....			Paul B. Roehm.....	Calumet*.....
Chassell.....	Andrew Clement.....	Chassell.....			Andrew Clement.....	Chassell*.....
Duncan.....	Patrick J. Elliott.....	Kenton, Box 5*.....			P. J. Elliott.....	Kenton, Box 5*.....
Elm River.....	Paul Krath.....	Winona.....			M. J. Finegan.....	Winona.....
Franklin.....	Andrew Johnson.....	Hancock, Box 717.....			William Val.....	Hancock.....
Hancock.....	Patrick Solmann.....	Hancock*.....			Patrick Solmann.....	Hancock, Box 717*.....
Laird.....	Herman Heikkinen.....	Nisula.....			Chas. Heissner.....	Nisula*.....
Oscola.....	Chas. Klein.....	Hubbelt*.....			Chas. Klein.....	Hubbelt*.....
Portage.....	Peter Ruehle, Sr.....	Houghton*.....			Peter Ruehle, Sr.....	Houghton*.....
Quincy.....	Thomas W. McDonald.....	Hancock*.....			Thos. W. McDonald.....	Hancock*.....

STATE HIGHWAY DEPARTMENT

TOWNSHIP HIGHWAY COMMISSIONERS.—*Continued.*

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner.	Post Office Address.
Houghton Co.—Con.						
Schoolcraft.....	Peter Bissonette.....	Lake Linden.....			Peter Bissonette.....	Lake Linden.*
Stanton.....	Conrad J. Burkman.....	Oskar*.....			Nels Burkman.....	Oskar.*
Torch Lake.....	James B. Cooper.....	Hubbell*.....			James B. Cooper.....	Hubbell.*
Huron County:						
Bingham.....	Robert Dobson.....	Ubyly R. D. 4*.....	5	Yes.....	John Martin.....	Ubyly.
Brookfield.....	William J. Wisner.....	Port Hope, R. D. 2*.....	2	Yes.....	Arthur Swayze.....	Harbor Beach, R. D. 2.
Brookfield.....	Melvin Chase.....	Owendale.....		No.....	William Kreitzschmer.....	Owendale.
Cassville.....	John Anderson.....	Cassville*.....	14	Yes.....	Amos Milwrick.....	Cassville.
Chandler.....	Samuel Alexander.....	Elkton*.....		No.....	Samuel Alexander.....	Elkton.*
Coffey.....	Jason Apley.....	Bad Axe, R. D. 3*.....	3	Yes.....	Peter H. Spurling.....	Bad Axe, R. D. 2
Dwight.....	John Wooster.....	Port Austin*.....	2	Yes.....	John Wooster.....	Port Austin, R. D. 22.*
Fair Haven.....	George Quick.....	Bay Port*.....	3	Yes.....	William H. Cole.....	Sebawaing, R. D. 4
Gore.....	Charles Ludsworth.....	Port Hope.....	1	Yes.....	William H. Cole.....	Port Hope, R. D. 1
Grant.....	Christian Pederson.....	Owendale, R. D. 1, Box 24*.....		No.....	Christian Pederson.....	Owendale, R. D. 1, Bx. 20
Hume.....	Irvin Bates.....	Kinde R. D. 3*.....		No.....	Irvin Bates.....	Kinde.*
Huron.....	Hugh Roes.....	Grindstone City, R. D. 2.....	1	Yes.....	August Brining.....	Port Hope.
Lake.....	Arthur McIntosh.....	Cassville.....	4	No.....	Frisbie Cobb.....	Cassville, R. D. 2
Lincoln.....	Samuel Sharrow.....	Bad Axe, R. D. 2*.....	4	Yes.....	Samuel Sharrow.....	Bad Axe, R. D. 2*
Meade.....	William Chapin.....	Caseville, R. D. 1.....	1	No.....	William Chapin.....	Cassville, R. D. 1*
McKinley.....	Thomas Willcox.....	Bay Port, R. D. 1.....	3	Yes.....	Thomas Willcox.....	Bay Port, R. D. 1.*
Oliver.....	John Peckings.....	Elkton, R. D. 2*.....	1	Yes.....	Wm. Heckroth.....	Elkton.
Paris.....	Thomas Jackowski.....	Ruth, R. D. 2.....		No.....	Thomas Jackowski.....	Ruth.*
Pontre aux Barques.....	Robert Brown.....	Pontre aux Barques.....	2	Yes.....	Robert Brown.....	Pontre aux Barques.*
Port Austin.....	Michael Mayes.....	Port Austin*.....	3	Yes.....	Michael Mayes.....	Port Austin, R. D. 2.*
Rubicon.....	Joseph Martin.....	Port Hope.....	4	Yes.....	Joseph Martin.....	Port Hope.
Sand Beach.....	Rudolph Shulte.....	Harbor Beach*.....		No.....	Samuel Richards.....	Harbor Beach.
Sebawaing.....	Christian Flegel.....	Sebawaing.....		No.....	Alfred Bach.....	Sebawaing.
Sheridan.....	Neil Watson.....	Bad Axe, R. D. 3*.....	10	No.....	Angus J. M. Isaac.....	Bad Axe, R. D. 3.
Sigel.....	Wm. J. Rogers.....	Harbor Beach, R. D. 3*.....	1	Yes.....	Wm. J. Rogers.....	Harbor Beach, R. D. 3.*
Sherman.....	Caleb Morgan.....	Harbor Beach.....		Yes.....	William Jukes.....	Harbor Beach, R. D. 1.
Verona.....	George Walrod.....	Bad Axe, R. D. 6*.....		No.....	Daniel K. McDonald.....	Bad Axe.
Winsor.....	Christ Groth.....	Bay Port.....		No.....	Samuel Geiger.....	Pigeon.
INGHAM COUNTY:						
Aaledon.....	Elliott J. Moore.....	Mason*.....		No.....	G. P. Lindsay.....	Mason.
Aurelius.....	Asa B. Wilson.....	Holt*.....	2	Yes.....	E. T. Elliott.....	Mason, R. D. 8.
Bunker Hill.....	James Quinn.....	Dansville*.....		No.....	James Quinn.....	Dansville, R. D. 33.*
Delhi.....	Benjamin Ollinger.....	Holt.....	1	Yes.....	Benjamin Ollinger.....	Holt.*
Ingram.....	Squire S. Holt.....	Dansville.....		No.....	Walter A. Fosdick.....	Dansville.
Lansing.....	Clark G. Russell.....	Lansing, Box 165.....	1	Yes.....	Walter J. Whitley.....	Lansing, R. D. 8.
Le Roy.....	Levi S. Alchin.....	Webberville*.....		No.....	Geo. H. Alchin.....	Webberville.*



Michigan avenue road, Springwells township, Wayne county, before improvement.

RECEIVED

NO

1944

Joyfield.	Alvin J. Spaulding.	Yes.	16	Benzonla, R. D. 1.	Benzonla, R. D. 1.*
Lake.	Albert Heley.	Yes.	4	Frankfort.*	Frankfort.
Plate.	John C. Blenaster.	Yes.	4	Honor.*	Honor.*
Weldon.	Wm. Joyce.	Yes.	1	Thompsonville.	Thompsonville.*
BAEREN COUNTY:					
Bainbridge.	William Weber.	Yes.	4	Watervliet, R. D. 2.	Watervliet, R. D. 4.
Benton.	John E. Deheid.	Yes.	3	Benton Harbor.	Benton Harbor.
Berrien.	Samuel Wright.	Yes.	1	Berrien Center, R. D. 2.	Berrien Center.
Berrian.	John H. Best.	Yes.	2	Buchanan, R. D. 3*.	Buchanan, R. D. 3.*
Buchanan.	Frank Nelson.	Yes.	3	Buchanan*.	Buchanan, R. D. 2.
Chickaming.	William Habel.	Yes.	1	Three Oaks.	Three Oaks.*
Gallen.	Burl L. Longfellow.	No.		Gallen*.	Gallen, R. D. 8.
Hagar.	John J. Daly.	Yes.	1	Benton Harbor, R. D. 4.	Riverside.
Lake.	Oscar Seavers.	No.		Bridgman.	Baroda.
Lincoln.	Henry Mathel.	No.		Stevensville.	Stevensville.
New Buffalo.	Elmer Butts.	Yes.	4	New Buffalo, R. D. 2*.	New Buffalo.*
Niles.	Francis M. Michael.	No.		Niles, R. D. 3*.	Niles, R. D. 3.
Oronoko.	Joseph T. Hoams.	No.		Berrien Springs, R. D. 2.	Berrien Springs.
Pipestone.	John Geisler.	Yes.	1	Eau Claire.	Eau Claire.*
Royalton.	Wilbur Luker.	Yes.	2	Sodus*.	St. Joseph, R. D. 3.*
Sodus.	William M. Wissing.	Yes.	2	St. Joseph, R. D. 1*.	Sodus.
St. Joseph.	Louis Rickert.	Yes.	12	Three Oaks.	St. Joseph, R. D. 1, Bx. 205
Three Oaks.	D. Walrath.	Yes.	1	Coloma*.	Three Oaks.
Watervliet.	Chas. H. Norris.	Yes.	5	Gallen*.	Watervliet.
Weesaw.		Yes.			Gallen.*
BRANCH COUNTY:					
Algansee.	Henry C. Waterbury.	No.		Montgomery*.	Montgomery, R. D. 35.*
Batavia.	Ward C. Gruner.	No.		Coldwater, R. D. 1.	Coldwater, R. D. 1.*
Bethel.	Walter Brockelbank.	No.		Bronson, R. D. 7*.	Bronson, R. D. 7.*
Bethon.	Joseph Seger.	No.		Bronson.	Bronson.
Butler.	Golden V. Dexter.	No.		Litchfield.	Litchfield.*
California.	David Goodrich.	No.		Ray, Indiana*.	Ray, Indiana.*
Coldwater.	S. B. Randall.	No.		Coldwater*.	Coldwater.*
Gilead.	Hugh R. Junk.	No.		Kindhook, R. D. 1.	Kindhook.*
Girard.	Homor Benson.	No.		Girard.	Union City, R. D. 5.
Kindhook.	Fred J. Peppratt.	No.		Coldwater, R. D. 3.	Coldwater, R. D. 3.
Mattison.	Edgar E. Croy.	No.		Bronson.	Sherwood.*
Noble.	Ernest Snook.	No.		Coldwater, R. D. 3.	Bronson, R. D. 4.
Ovid.	George H. Lockwood.	No.		Quincy.	Coldwater, R. D. 8.
Quincy.	Albert J. Warner.	Yes.	4	Sherwood.	Quincy.
Sherwood.	Milo Silbaugh.	No.		Union City*.	Sherwood.
Union.	Charles A. Zimmerman.	No.			Union City.
CALHOUN COUNTY:					
Albion.	J. E. Snelgrove.	No.		Homer.	Homer.*
Athens.	Resh Eitner.	No.		Athens.	Athens.*
Battle Creek.	George R. Peet.	Yes.	2	Battle Creek, R. D. 10*.	Battle Creek, R. D. 2.
Bedford.	F. E. Boyer.	No.		Battle Creek, R. D. 6.	Battle Creek, R. D. 6.*
Burlington.	Harley Van Schoick.	Yes.	2	Union City, R. D.*.	Union City.
Clarendon.	J. L. Corlette.	No.		Springport.	Springport.*
Clarendon.	Parley B. Shilling.	Yes.	2	Homer, R. D.*.	Homer, R. D. 2.*
Conviss.	James Huggatt.	Yes.	5	Bellevue*.	Ceresco.

STATE HIGHWAY DEPARTMENT

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner.	Post Office Address.
ISABELLA CO. —Con.						
Coldwater.....	Royal St. Johns.....	Crooked Lake, R. D. 1*.	1	No.....	Adam Getz.....	Crooked Lake, R. D. 1.
Deerfield.....	Charles J. Craven.....	Mt. Pleasant, R. D. 10.	7	Yes.....	Charles J. Craven.....	Mt. Pleasant, R. D. 10.*
Denver.....	Thos. A. McGregor.....	Loomis.....	12	Yes.....	R. Spickman.....	Rosebush, R. D. 1.
Fremont.....	John H. Taylor.....	Mt. Pleasant*.....	3	Yes.....	John H. Taylor.....	Mt. Pleasant*.....
Gilmore.....	Ed Fordyce.....	Farwell, R. D. 1.....	1	Yes.....	Ed Fordyce.....	Farwell*.....
Isabella.....	Samuel Cameron.....	Rosebush.....	1	Yes.....	Wm. J. Prout, Jr.....	Rosebush, R. D. 1.
Lincoln.....	William R. Hong.....	Mt. Pleasant, R. D. 4.....	8	Yes.....	Edward Townsend.....	Shepherd, R. D. 1.
Notawa.....	Peter Schuler.....	Beal City.....	1	No.....	John Fox.....	Mt. Pleasant, R. D. 6.
Rolland.....	Ivan C. Powers.....	Blanchard.....	2	Yes.....	Blanchard*.....	Blanchard*.....
Sherman.....	John Bentler.....	Weidman, R. D. 1*.....	1	Yes.....	John H. Gardiner.....	Weidman, R. D. 1.
Union.....	John Morris.....	Mt. Pleasant, R. D. 2.....	1	Yes.....	John Morris.....	Mt. Pleasant, R. D. 2.*
Vernon.....	John Astlie.....	Clare, R. D. 3.....	1	Yes.....	William F. Dodge.....	Clare, R. D. 3.
Wise.....	Richard Raymond.....	Loomis, R. D. 1.....	1	No.....	Jefferson Grounds.....	Loomis.
JACKSON COUNTY:						
Blackman.....	James T. McConnell.....	Jackson, R. D. 3*.....	1	No.....	Hugh Woodworth.....	Jackson.
Columbia.....	Adam Miller.....	Brooklyn.....	1	No.....	Frank Austin.....	Brooklyn.
Concord.....	Ralph J. Osborne.....	Concord*.....	1	No.....	Charles W. Dart.....	Concord, R. D. 1.
Grass Lake.....	Wm. M. Robinson.....	Grass Lake*.....	1	No.....	William M. Robinson.....	Grass Lake*.....
Hanover.....	Seth B. Snyder.....	Hanover.....	4	Yes.....	Seth B. Snyder.....	Hanover*.....
Henrietta.....	W. A. Leake.....	Munith*.....	4	Yes.....	W. A. Leake.....	Munith*.....
Leoni.....	William London.....	Leoni*.....	4	No.....	Seth J. Sargent.....	Jackson, R. D. 2.
Liberty.....	Franklin L. Meacham.....	Jackson, R. D. 1*.....	4	Yes.....	Frank Blossom.....	Clark's Lake, R. D. 2.
Napoleon.....	Harry Crego.....	Napoleon*.....	2	No.....	William Hall.....	Napoleon.
Norvell.....	Elmer Owens.....	Norvell.....	2	No.....	Samuel Hurlbutt.....	Norvell.
Parma.....	Gardner L. Hunn.....	Parma*.....	9	Yes.....	Gardner L. Hunn.....	Parma*.....
Pulaski.....	John T. Beebe.....	Concord, R. D. 2*.....	8	Yes.....	John T. Beebe.....	Concord, R. D.*
Rives.....	Levant Bartholf.....	Rives Junction*.....	3	Yes.....	Levant Bartholf.....	Rives Junction*.....
Sandstone.....	F. C. Sackrider.....	Jackson, R. D. 5*.....	1	No.....	Chas. Cochran.....	Parma*.....
Spring Arbor.....	Geo. W. Wheeler.....	Parma*.....	1	Yes.....	Geo. W. Wheeler.....	Parma*.....
Springport.....	Ludus S. Curtis.....	Springport*.....	1	No.....	George Bels.....	Springport.
Summit.....	John Kimmel.....	Jackson, R. D. 1.....	1	Yes.....	George Hartman.....	Jackson, R. D. 5.
Tompkins.....	Jas. C. Thompson.....	Rives Junction, R. D. 1.....	1	No.....	James C. Thompson.....	Rives, R. D. 1.*
Waterloo.....	Ferdinand Steglist.....	Munith.....	1	Yes.....	Ferdinand Steglist.....	Munith*.....
KALAMAZOO COUNTY:						
Alamo.....	James C. Powell.....	Plainwell, R. D. 3.....	1	Yes.....	J. T. Bogardus.....	Alamo.
Brady.....	Wm. Southworth.....	Vicksburg.....	1	Yes.....	Wm. R. Southworth.....	Vicksburg*.....
Charleston.....	William Anderson.....	Climax.....	1	Yes.....	Albert Backus.....	Galesburg.
Climax.....	Springer Res.....	Scotts.....	1	No.....	E. C. Butler.....	Scotts, R. D. 28.
Comstock.....	John Sherman.....	Kalamazoo, R. D. 3*.....	1	Yes.....	John Sherman.....	Kalamazoo, R. D. 3.*
Cooper.....	Willard M. Huntley.....	Kalamazoo, R. D. 12.....	1	No.....	Geo. W. Hollowell.....	Kalamazoo, R. D. 12.

Kalamazoo.	D. J. Schlobohm.	Kalamazoo, R. D. 2*.	4	Yes.	Gaylord S. Vosler.	Kalamazoo, R. D. 2.
Oakhtemo.	Fred Behrmet.	Kalamazoo, R. D. 9*.	2	Yes.	Fred Behrmet.	Kalamazoo, R. D. 9*.
Pavilion.	Frank Dibble.	Galesburg*.		No.	Frank D. Dibble.	Galesburg*.
Portage.	Bert Sheldon.	Schoolcraft, R. D. 41.	1	Yes.	Bert Sheldon.	Schoolcraft, R. D. 41*.
Prairie Ronde.	Geo. H. Martin.	Schoolcraft.		No.	Byron Carney.	Schoolcraft.
Richland.	G. B. Brigham.	Richland*.		No.	Gordon B. Brigham.	Richland*.
Ross.	Charles H. Lawrence.	Augusta*.		No.	Charles E. Clark.	Yorkville.
Schoolcraft.	W. W. Frakes.	Vicksburg, R. D. 36*.	9	Yes.	W. W. Frakes.	Vicksburg, R. D. 36*.
Texas.	N. H. Steele.	Schoolcraft, R. D. 40.		No.	N. H. Steele.	Schoolcraft, R. D. 40*.
Wakehma.	John Holt.	Fulton*.		No.	James Stock.	Fulton.
KALKASKA COUNTY:						
Boardman.	Geo. Ryckman.	South Boardman, R. D.	1	Yes.	William Ives.	South Boardman.
Clearwater.	Simson Way.	Rapid City, R. D. 2*.	3	Yes.	Simson Way.	Rapid City, R. D. 2*.
Coldsprings.	John V. Doty.	Leetsville.		No.	John V. Doty.	Leetsville*.
Excelsior.	Im H. Eckles.	Kalkaska.	6	Yes.	Ira H. Eckler.	Kalkaska, R. D. 1*.
Garfield.	Almon R. Beala.	Sharon.		No.	Chas. Benjamin DePeel.	Fife Lake, Box 74.
Kalkaska.	Chas. Benjamin DePeel.	Kalkaska*.		No.	Chas. Benjamin DePeel.	Kalkaska*.
Oliver.	Jacob Hill.	Kalkaska.	1	Yes.	Henry I. Six.	Spencer.
Orange.	Charles Steding.	Spencer, Box 66.		No.	Wilbur Ely.	Kalkaska, R. D. 1.
Rapid River.	L. M. Tiffany.	Leetsville.	1	Yes.	Oly Anderson.	Westwood*.
Springfield.	Fred W. Bourne.	Fife Lake*.	3	Yes.	George Briggs.	South Boardman.
Wilson.	Patrick Dockery.	Williamsburg, R. D.	21	Yes.	Patrick Dockery.	Williamsburg*.
KENT COUNTY:						
Ada.	Alfred Welton.	Ada*.	3	Yes.	William S. Holmes.	Ada.
Alcona.	Eddie Rysburn.	Sparta.		No.	Herman C. Smith.	Cedar Springs, R. D. 31.
Alpine.	Joseph Anderson.	Alpine, R. D. 17*.	2	Yes.	Joseph Anderson.	Alpine, R. D. 17*.
Bowne.	Samuel Smith.	Alto.	1	Yes.	F. W. McNaughton.	Alto, R. D. 55.
Byron.	William F. Moses.	Byron Centre*.	2	Yes.	Charles Ball.	Byron Centre.
Caledonia.	James I. Heffern.	Caledonia, R. D. 50*.	5	Yes.	David Herman.	Caledonia, R. D. 50*.
Cannon.	Thomas Johnson.	Adia, R. D. 49, Box 60.		No.	Timothy Farrell.	Rockford, R. D. 26.
Courtland.	Byron F. Smith.	Rockford, R. D. 25*.	1	Yes.	Deaithy C. Blood.	Rockford.
Gaines.	Amos Leatherman.	Dutton, R. D. 40*.		No.	Fred Carlyle.	Dutton, R. D. 60.
Grand Rapids.	Amasa G. Dupre.	Grand Rapids, R. D. 4.	8	Yes.	D. R. Walker.	Grand Rapids, R. D. 6.
Grattan.	Simon W. Matice.	Belding, R. D. 16*.	1	Yes.	Harry O'Horse.	Belding, R. D. 17.
Lowell.	James M. Peterson.	Lowell.		No.	Almon F. Mason.	Lowell*.
Nelson.	C. G. Thudall.	Cedar Springs, R. D. 5*.	3	Yes.	James McPherson.	Cedar Springs, R. D.
Oakfield.	Isasper H. Deal.	Greenville, R. D. 11*.	2	Yes.	A. W. Howard.	Rockford.
Paris.	Myron L. Tyler.	Rockford, R. D. 26.	2	Yes.	Frank J. Mason.	Grand Rapids, R. D. 11*.
Plainfield.	Amos Tiesman.	Rockford, R. D. 26.	1	Yes.	M. L. Tyler.	Rockford*.
Solon.	John Heiss.	Cedar Springs, R. D. 30*.	2	Yes.	Amos Crissman.	Cedar Springs, R. D. 30*.
Sparta.	Nelson A. Shaw.	Harvard, R. D. 38*.	2	Yes.	John Heiss.	Sparta*.
Spencer.	Lee Hatch.	Kent City.	4	Yes.	Nelson A. Shaw.	Sand Lake, R. D. 37.
Tyngone.	A. H. Barrett.	Kent City.	3	Yes.	Sam Medler.	Kent City.
Vernon.	Godfrey Reusser.	Lowell, R. D. 50.	1	Yes.	John Coaler.	Lowell, R. D. 50*.
Walker.	Albert R. Edison.	Grand Rapids*.		No.	Godfrey Reusser.	Grand Rapids, R. D. 13.
Wyoming.	Cornelius Huizenga.	Grandville*.	2	Yes.	Joseph Mullins.	Grandville.

STATE HIGHWAY DEPARTMENT

TOWNSHIP HIGHWAY COMMISSIONERS.—Continued.

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner.	Post Office Address.
KEWENEAW COUNTY:						
Alouez.....	S. Russell Smith.	Alouez.			S. Russell Smith.	Alouez.*
Eagle Harbor.....	Mike Kraus.	Eagle Harbor.			Mike Kraus.	Eagle Harbor.*
Grant.....	Peter Hepthing.	Phoenix Mine.			Jacob Blazer.	Mandan.
Roughiton.....	Eric Besonen.	Gay*.			Peter Hepthing.	Phoenix Mine.*
Sherman.....					James Duby.	Gay.
LAKE COUNTY:						
Chase.....	Stephen Sadler.	Chase*.	3	Yes.	Stephen Sadler.	Chase.*
Cherry Valley.....	Samuel Kuhns.	Nirvana*.	3	Yes.	Samuel Kuhns.	Nirvana.*
Dover.....	Fred Robinson.	Tustin, R. D. 1.	1	Yes.	Fred Robinson.	Tustin, R. D. 1.*
Eden.....	Hiram Cronk.	Dublin*.		No.	Hiram Cronk.	Dublin, Box 26.*
Eik.....	John Honsowetz, Jr.	Branch.	1	Yes.	John Honsowetz, Jr.	Branch.*
Ellsworth.....	James Curtice.	Luther, R. D. 1.	1	Yes.	Joseph Bull.	Luther.
Lake.....	Nils Johnson.	Branch, R. D. 1*.	2	Yes.	Nils Johnson.	Branch, R. D. 1.*
Newkirk.....	Claude Nicholson.	Luther.	1	Yes.	Claude M. Nicholson.	Luther.*
Pinora.....	Alex. Campbell.	Reed City, R. D. 1*.		No.	Otto Johnson.	Reed City, R. D. 1.
Pleasant Plains.....	Charles Cavanaugh.	Baldwin.	1	Yes.	Jesse Bradford.	Baldwin.
Webber.....	Edwin Kinney.	Baldwin*.	6	Yes.	Edwin Kinney.	Baldwin.*
LAPEER COUNTY:						
Almont.....	Arthur J. Fox.	Almont.	1	Yes.	Evert W. Ferguson.	Almont.
Arcada.....	Fred Schwerin.	Kings Mills.	1	Yes.	John Crawford.	Imlay City.
Attica.....	A. H. McMullen.	Attica.	1	Yes.	Lee G. Smith.	Attica.
Burlington.....	Chas. H. Willson.	Clifford*.	6	Yes.	C. H. Willson.	Clifford.*
Burnside.....	George B. Wilcox.	Burnside, R. D. 1.		No.	Wm. Murry.	North Branch, R. D. 2.
Deerfield.....	A. Emory Warren.	No. Branch.		Yes.	Edgar Mahan.	Fostoria.
Dryden.....	Byron S. Folsom.	Dryden.	1	Yes.	Byron S. Folsom.	Dryden.*
Elba.....	Arthur Potter.	Lapeer.	1	No.	Fred G. Bullock.	Lapeer, R. D. 2.
Goodland.....	Chas. P. Churchill.	Imlay City.		No.	Chas. P. Churchill.	Imlay City.*
Hadley.....	George Torpe.	Metamora, R. D. 1*.		No.	Wm. A. Schrader.	Hadley.
Imlay.....	Albert Dorow.	Imlay City*.	8	Yes.	Albert Dorow.	Imlay City.*
Lapeer.....	Joseph Howes.	Lapeer, R. D. 5.	1	Yes.	Joseph Howes.	Lapeer, R. D. 5.*
Marathon.....	Charles Arund.	Columbiaville*.	2	Yes.	James Sweet.	Columbiaville.
Mayfield.....	Wm. Kichlennaster.	Lapeer, R. D. 1.	1	Yes.	Charles D. Rich.	Lapeer.
Metamora.....	William C. Rossmann.	Metamora.	1	Yes.	Frank Farley.	Metamora.
North Branch.....	John A. Dennis.	North Branch*.	7	Yes.	Geo. Jones.	North Branch, R. D.
Oregon.....	Henry Cronick.	Columbiaville.	1	Yes.	Wm. Topham.	Lapeer.
Rich.....	Frank Snover.	Silverwood.	1	Yes.	Mark Rumph.	Silverwood.
LELANAU COUNTY:						
Bingham.....	Levi Lindly.	Sutton's Bay, R. D. 2.	3	Yes.	Joseph Kulmin.	Suttons Bay, R. D. 2.
Centerville.....	William Kropp.	Maple City, R. D. 1*.	4	Yes.	William Kropp.	Maple City, R. D. 1*.

Cleveland	Joseph Steiger	Maple City*	Yes	9	Yes	Joseph Steiger	Maple City *
Elmwood	William Fouch	Traverse City, R. D. 5	Yes	1	Yes	Geo. Newman	Traverse City, R. D. 2.
Empire	David Stager	Empire	No		No	Peter Stormer	Empire
Glen Arbor	Wesley C. Ray	Glenmore	No		No	W. C. Ray	Glenmore *
Kasson	Edward Cluff, Sr.	Maple City	Yes	1	Yes	Edward Cluff, Sr.	Maple City *
Leelanau	Wm. Bartlett	Northport	Yes	1	Yes	Wm. Bartlett	Northport *
Leland	Joseph Valley	Provenant	Yes	4	Yes	Joseph Valley	Provenant *
Solon	John Nolan	Cedar	No		No	John Nolan	Cedar *
Sutton's Bay	L. Solon	Sutton's Bay*	Yes	2	Yes	Wm. Walter	Sutton's Bay.
LENAWEE COUNTY:							
Adrian	John Fitch	Adrian, R. D. 7*	Yes	18	Yes	John A. Fitch	Adrian *
Blissfield	Thomas Stadler	Blissfield, Box 68*	Yes	3	Yes	Thos. Stadler	Blissfield *
Cambridge	Jacob Russell	Onsted*	No		No	Jacob W. Russell	Onsted *
Clinton	Frank Gray	Clinton*	Yes	2	Yes	Frank Gray	Clinton, Box 182 *
Deerfield	Robert Larnold	Clinton	Yes	1	Yes	Elmer Thompson	Deerfield
Dover	Almon J. Roberts	Clinton	Yes	3	Yes	A. J. Roberts	Clinton *
Fairfield	Harry D. Brower	Weston, Box 23	Yes	1	Yes	Henry D. Brower	Weston, Box 23 *
Franklin	Frank E. Derby	Tipton*	No		No	James Sloan	Tipton.
Hudson	George W. Rooney	Tipton, R. D. *	Yes	2	Yes	George W. Scarlett	Clinton
Macdon	J. Hyroid Hatch	Tecumseh, R. D. *	Yes	3	Yes	Frank W. Telford	Sand Creek *
Madison	Frank W. Telford	Sand Creek*	No		No	Elmer Stites	Fayette, Ohio, R. D. 12 *
Medina	Allen McComb	Fayette, Ohio*	Yes	4	Yes	Allen McComb	Jasper, R. D. 2 *
Ogden	John Miller	Jasper, R. D. 2*	Yes	2	Yes	John H. Miller	Palmyra *
Palmyra	Charles R. Keeber	Palmyra*	Yes	3	Yes	Chas. R. Keeber	Adrian, R. D. 3 *
Raisin	Walter L. Exelby	Adrian, R. D. 3*	Yes	2	Yes	Walter L. Exelby	Britton *
Ridgeway	Wm. Hazard	Britton*	Yes	3	Yes	Elmer Deline	Riga, R. D. 7.
Riga	Amos Ford	Addison*	No	1	No	J. C. Crofoot	Addison.
Rollin	Joseph Burton	Adrian, R. D. 7	Yes	2	Yes	Levi Hawley	Adrian, R. D. 7.
Rome	Alfred Williams	Seneca	Yes	1	Yes	Nathaniel Burch	Seneca.
Seneca	Robert W. Cole	Tecumseh, Box 373*	No		No	Robert W. Cole	Tecumseh, Box 373 *
Woodstock	Arkwell Alderdyce	Brooklyn, R. D. 1*	No		No	A. Alderdyce	Brooklyn, R. D. 1 *
LIVINGSTON COUNTY:							
Brighton	Frank Prosser	Brighton*	No		No	Frank E. Bidwell	Brighton, R. D. 3.
Cohoctah	J. E. Gleason	Fowlerville, R. D. 2	Yes	1	Yes	Schuyler Wrigglesworth	Cohoctah.
Conway	Frank E. Dailey	Fowlerville	Yes	1	Yes	Frank E. Dailey	Fowlerville *
Deerfield	John Patterson	Oak Grove, R. D. 3	No		No	John Patterson	Oak Grove *
Genoa	Wm. Beattie	Howell*	Yes	2	Yes	Frank Sharp	Howell.
Green Oak	John Todd	Hamburg Lake	Yes	1	Yes	Orange Peach	Rushton.
Hamburg	William H. Keedle	Hamburg	Yes	2	Yes	Wm. H. Keedle	Hamburg *
Handy	William H. Keedle	Fowlerville*	Yes	2	Yes	Geo. Gibson	Fowlerville.
Harland	William H. Keedle	Brighton, R. D. 4	Yes	2	Yes	James H. Brian	Harland.
Howell	Eugene E. Howe	Howell, R. D. 3*	Yes	1	Yes	Eugene E. Howe	Howell *
Iscos	Albert P. Foster	Fowlerville, R. D. 3*	Yes	4	Yes	L. L. Baker	Fowlerville.
Marion	Geo. L. Wright	Howell*	Yes	2	Yes	Ezra F. Brigham	Howell, R. D. 3.
Oscola	John P. Lockwood	Howell*	Yes	2	Yes	Austin Kimberley	Howell, R. D. 6.
Punam	Fred Greive	Pickney	Yes	7	Yes	Casper Vollmer	Pickney.
Tyrone	William H. Callaghan	Fenton, R. D. 3*	Yes	1	Yes	Frank Heath	Fenton, R. D. 4.
Unadilla	J. B. Livermore	Gregory	Yes	6	Yes	Frank Heath	Gregory *
			Yes	4	Yes	Jas. B. Livermore	

STATE HIGHWAY DEPARTMENT

County and Township.	1907				1908	
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LUCE COUNTY:						
Columbus.....	Fred Brown.....	Laketon.....			Fred Brown.....	Laketon.*
Lakefield.....	Louis Mark.....	Helmer.....			Louis Mark.....	Helmer.*
McMillan.....	William Richardson.....	Dollarville.....			Olaf Johnson.....	Newberry.*
Pentland.....	Charles Carlson.....	Newberry.....			Chas. Carlson.....	Newberry.*
MACKINAC COUNTY:						
Bois Blanc.....	Claud Corlette.....	Walker's Point*.....			Claud J. Corlette.....	Walker's Point.*
Brevort.....	John Pechta.....	Allenville.....			Wm. Langdon.....	Allenville.
Clark.....	Walter C. Redcliff.....	Hessel.....			William White.....	Cedarville.
Garfield.....	William Rosebush.....	Rapinville.....			Frank Quinn.....	Engadine.
Hendricks.....	A. R. Cogswell.....	Rexton*.....			Benjamin H. Lockwood.....	Rexton.
Hudson.....	Harvey Nettleton.....	Pickford*.....			Wm. Hanson.....	Rexton.
Marquette.....	John St. Louis.....	Groscaup.....			John Hillocks.....	Pickford.
Moran.....	Edmund Aslin.....	Gould City*.....			Jacob Hough.....	Ozark.
Newton.....	John Carlson.....	Curtis*.....			Frank Stites.....	Gould City.
Portage.....	Frank A. Grondin.....	St. Ignace.....			John Carlson.....	Curtis, Box 31.*
St. Ignace.....					F. A. Grondin.....	St. Ignace.*
MACOMB COUNTY:						
Armada.....	Neil Mills.....	Armada*.....	4	Yes.	Neil Mills.....	Armada.*
Bruce.....	John R. Taylor.....	Romeo*.....	3	Yes.	Wm. Bell.....	Romeo, R. D. 3.
Chesterfield.....	Henry Callens.....	New Baltimore*.....	10	Yes.	Henry Callens.....	New Baltimore.*
Clinton.....	William A. Wolf.....	Mt. Clemens R. D. 6*.....	5	Yes.	Thomas Quinn.....	Mt. Clemens.
Erin.....	Henry Paton.....	Roseville, R. D. 1.....	5	Yes.	Henry Paton.....	Roseville.*
Harrison.....	James Campan.....	Mt. Clemens.....	1	Yes.	Alfred Tucker.....	Mt. Clemens.
Lenox.....	William Stier.....	New Haven*.....	5	Yes.	Chris Schultz, Jr.....	New Haven.
Macomb.....	John C. Brass.....	Mt. Clemens, R. D. 1*.....	4	Yes.	John C. Brass.....	Mt. Clemens, R. D. 1.*
Ray.....	Christopher Heydenreich.....	Washington, R. D. 1*.....	2	Yes.	Wm. C. Hartway.....	Richmond, R. D. 3.
Richmond.....	William Evans.....	Richmond.....	1	Yes.	Wm. I. Evans.....	Richmond, R. D. 3.*
Shelby.....	Frank A. Wilson.....	Utica, R. D. 1*.....	3	Yes.	Frank A. Wilson.....	Utica, R. D. 1.*
Sterling.....	Ernest Gentz.....	Mt. Clemens, R. D. 7.....	1	Yes.	Ernest Gentz.....	Mt. Clemens, R. D. 7.*
Warren.....	Anthony Wolf.....	Warren, R. D. 2*.....	7	Yes.	Anthony Wolf.....	Warren, R. D. 2.*
Washington.....	Thaddeus Hazelton.....	Washington.....	1	Yes.	Thaddeus Hazelton.....	Washington.*
MANISTEE COUNTY:						
Armada.....	Peter J. Peterson.....	Armada.....	1	Yes.	Owen Van Buskirk.....	Armada.
Beard Lake.....	Ben Stevenson.....	Onetama.....		No.	Ben Stevenson.....	Onetama.*
Brown.....	Charles Griffiths.....	Chief*.....	3	Yes.	James G. Kenny.....	Chief.
Cleon.....	Frank Stiver.....	Pomona.....	4	Yes.	Frank Stiver.....	Pomona.*
Dickson.....					Valentine Graf.....	Brooklyn.
Fier.....	John A. Dalika.....	Fier City.....	15	Yes.	John A. Dalika.....	Fier City.*
Manistee.....	August Johnson.....	Manistee, R. D. 1, Box 96.....	1	Yes.	August Johnson.....	Manistee, R. D. 1, Bx. 96*
Maple Grove.....	Gust Johnson.....	Kaleva*.....	2	Yes.	Gustaf Johnson.....	Kaleva.*



Michigan avenue road, Springwells township, Wayne county, before improvement.

STATE HIGHWAY DEPARTMENT

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MECHOSTA Co.—Cont.						
Meosta.....	H. B. Thurston.....	Stanwood.....	1	Yes.....	Fred Hargett.....	Stanwood.....
Millbrook.....	Peter D. Sparks.....	Blanchard, R. D. 2.....		No.....	John M. Culp.....	Blanchard, R. D. 2.....
Morton.....	J. C. Morton.....	Remus, R. D.....	7	Yes.....	J. C. Morton.....	Remus, R. D. 2.....
Sheridan.....	Henry Oterbine.....	Remus.....	2	Yes.....	William B. Martin.....	Remus.....
Wheatland.....	Wilbur A. Reynolds.....	Remus.....	1	Yes.....	Wilbur A. Reynolds.....	Remus.....
MENOMINEE COUNTY:						
Cedarville.....	John Williams.....	Cedar River.....			John Williams.....	Cedar River.....
Harris.....	Joseph P. Kell.....	Harris.....			Joseph P. Kell.....	Harris.....
Holmes.....	Eugene Houde.....	Nathan, R. D. 2.....			Charles Ross.....	Daggett.....
Ingluston.....	Edward Paulson.....	Wallace, R. D. 2.....			Edward Paulson.....	Wallace, R. D. 2.....
Mellen.....	Andrew Wallin.....	Wallace.....			Andrew Wallin.....	Wallace.....
Menominee.....	Nels J. Herrild.....	Menominee, R. D. 1.....			Martin Kraus.....	Menominee, R. D. 1.....
Meyer.....	John McIlroy.....	Hermansville.....			John McIlroy.....	Hermansville.....
Nadeau.....	Joseph Sherry.....	Nadeau.....			Joseph Sherry.....	Nadeau.....
Spaulding.....	Joseph Better.....	Spaulding.....			Joseph Better.....	Spaulding.....
Stephenson.....	John Leavick.....	Stephenson.....			John Leavick.....	Daggett, R. D. 2.....
MIDLAND COUNTY:						
Edenville.....	John D. Craig.....	Sanford.....	1	No.....	Frank Murphy.....	Edenville.....
Geneva.....	Peter Schad.....	North Bradley.....		Yes.....	John Fenton.....	Coleman, R. D. 3.....
Greendale.....	Norman O. Vinton.....	Shepherd, R. D. 3.....	3	No.....	Herman J. Cathien.....	Stearns.....
Homer.....	Grant Wyman.....	Midland, R. D. 2.....		Yes.....	Morris Kelly.....	Midland, R. D. 2, Box 48.....
Hope.....	Wm. Maxwell, Jr.....	Hope, R. D. 1.....	12	No.....	Samuel Fillmore.....	Hope.....
Ingersoll.....	Thomas W. Reeves.....	Midland.....	1	Yes.....	T. W. Reeves.....	Midland, R. D. 7.....
Jasper.....	Leslie Pickens.....	St. Louis.....	11	Yes.....	Leslie Pickens.....	St. Louis.....
Jerome.....	Lott S. Holmes.....	Sanford.....		Yes.....	William Francis.....	Sanford.....
Larkin.....	John F. Howe.....	Midland, R. D. 6, Box 37.....		No.....	Sheldon J. Noble.....	Midland, R. D. 6.....
Lee.....	Isaac Hittman.....	Midland, R. D. 5.....	1	No.....	Isaac Hittman.....	Midland, R. D. 5.....
Lincoln.....	Matt Coats.....	Midland, R. D. 8, Box 31.....		Yes.....	B. C. Madison.....	Midland, R. D. 8.....
Midland.....	Frank Howard.....	Midland.....	2	No.....	Joseph Howard.....	Midland, R. D. 3.....
Mills.....	Malcolm McLaren.....	Midland, R. D. 6, Box 60.....	2	Yes.....	Joseph Murphy.....	Brer.....
Mt. Haley.....	James Long.....	Merrill, R. D. 2.....	1	Yes.....	Reinhold Abraham.....	Midland, R. D. 3.....
Porter.....	Oliver Wolski.....	Breckenridge, R. D. 4.....	2	Yes.....	Wm. J. Tiffin.....	Breckenridge, R. D. 4.....
Warren.....	A. G. Bell.....	Coleman.....	2	Yes.....	Serial Parmenter.....	Coleman, R. D. 1.....
MISSAUKIE COUNTY:						
Aetna.....	Peter G. Vincent.....	Falmouth.....	1	Yes.....	William H. Parks.....	Lake City.....
Bloomfield.....	Elijah Arnold.....	Morey.....		No.....	Frank Gann.....	Manton, R. D. 2.....
Butterfield.....	Wm. Rupright.....	Butterfield.....		No.....	Allen Paget.....	Butterfield.....
Cadwell.....	John Slack.....	Manton, R. D. 2.....		No.....	Yarn Burholder.....	Manton.....
Ciam Union.....	Henry T. Mulder.....	Prosper.....		No.....	Henry T. Mulder.....	Prosper.....



Michigan avenue road, Springwells township, Wayne county, after improvement. Vitrified brick pavement, laid on concrete. Built by county road commission. •

Enterprise	John H. Voss.....	Star City*	No.	D. D. Wiggins	Star City.
Forest	John Gillows.....	Morey	Yes.	John Gillows.....	Morey.*
Lake	John Armstrong.....	Lake City, Box 25*	4	C. J. Jackson.....	Lake City.
Norwich	William Minard.....	Moorestown.	No.	William Cantwell, Jr.	Moorestown.
Pioneer	Edwin Welas.....	Morey	No.	George H. McBrien.....	Morey.
Reeder	Edward Gaffney.....	Lake City*	2	Clarence Milligan.....	Lake City.
Richland	John Scholten.....	Lucas	No.	Jacob Heintgen.....	Lucas.
Riverside	Fred A. Howe.....	Galt	No.	Isaac Burkett.....	Galt.
West Branch.	Owen McMahon.....	Cutcheon.	No.	Albert Sheldon.....	Missaukee.
MONROE COUNTY:					
Ash.	W. L. Hause.....	Carleton*	8	Hank Asam.....	Carleton.
Bedford.	Rufus Spotts.....	Temperance.	2	Rufus Spotts.....	Temperance.*
Berlin.	Jacob F. Renner.....	Newport*	No.	Joseph Valiquette.....	South Rockwood.
Dundee.	Thomas Hall.....	Dundee*	3	Thomas Hall.....	Dundee.*
Erie.	Eli Jacobs.....	Erie*	9	Moses Evans.....	Erie.
Exeter.	Paul Steffes.....	Scofield.	1	Paul Steffes.....	Scofield.*
Frenchtown.	Frank F. Roberts.....	Monroe, R. D. 4*	4	Albert Stoddard.....	Monroe.
Ida.	William Wittkop.....	Ida, R. D. 2..	1	William Wittkop.....	Ida, R. D. 2.*
La Salle.	John R. Leasey.....	La Salle.	1	John R. Leasey.....	La Salle.
London.	Andrew Mueldeisen.....	Maybee.	1	Andrew J. Muehleisen.....	Maybee.*
Milan.	Newell Holcomb.....	Milan, R. D. 1*	11	Wm. Lee.....	Milan.
Monroe.	Patrick Navarre.....	Monroe.	4	Patrick Navarre.....	Monroe.*
Raisinville.	Henry G. Enders.....	Monroe, R. D. 2*	2	Fred D. Crossman.....	Monroe, R. D. 1.
Summerfield.	William Thompson.....	Petersburg.	10	William G. Thompson.....	Petersburg.*
Whiteford.	David Lamb.....	Ottawa Lake.	1	David J. Lamb.....	Ottawa Lake, R. D. 2.*
MONTCALM COUNTY:					
Belvidere.	Philip Rhoads.....	Six Lakes.	3	Philip Rhoads.....	Six Lakes.*
Bloomer.	Martin Grace.....	Carson City	1	Byron O. Goothrie.....	Carson City, R. D. 2.
Bushnell.	Geo. Chapman.....	Fenwick.	No.	Noah B. Gallup.....	Sheridan.
Cato.	Albert J. Bucholtz.....	Lakeview, R. D. 5.	1	Albert J. Bucholtz.....	Lakeview.*
Cystal.	L. R. Phillips.....	Carson City, R. D. 1*	No.	H. P. Phillips.....	Carson City, R. D. 1.*
Day.	Wm. Walker.....	Stanston*	No.	H. P. Phillips.....	McBride.
Douglas.	Thomas C. Crooks.....	Entrican*	7	Thomas C. Crooks.....	Entrican.*
Eureka.	Edwin F. Tallman.....	Greenville, R. D. 4.	1	George W. Perry.....	Greenville, R. D. 5.
Evergreen.	George H. Eitterman.....	Sheridan, R. D. 2*	3	George H. Eitterman.....	Sheridan.*
Fair Plain.	Chris Larsen.....	McBride.	1	Chris Larsen.....	Sheridan, R. D. 2.*
Ferris.	Edward Swarthout.....	Edmore*	5	Edmund Burne.....	Vestaburg, R. D. 1.
Horne.	John McCarthy.....	Trufant.	1	John McCarthy.....	Edmore.*
Maple Valley.	James Ford.....	Gowen*	2	James Ford.....	Trufant.*
Montcalm.	Julius Singer.....	Sand Lake.	1	Oscar B. Schermerhorn.....	Greenville.
Pine.	Albert H. Brown.....	Trufant, R. D. 1.	2	Dora D. Jacqua.....	Person.
Reynolds.	Nels Anderson.....	Howard City.	1	Nels Anderson.....	Trufant, R. D. 1.*
Richland.	Fred H. La Barr.....	Vestaburg, R. D. 1*	2	Fred H. La Barr.....	Howard City.*
Sidney.	C. M. Erskin.....	Sheridan, R. D. 1*	2	Ora Nickerson.....	Vestaburg.
Winfield.	L. C. Madison.....	Howard City, R. D. 3*	2	L. C. Madison.....	Sheridan, R. D. 1.*
MONTMERCY CO.:					
Albert.	Patrick O'Donnell.....	Lewiston*	2	Patrick O'Donnell.....	Lewiston.*
Avery.	William Heinzman.....	Atlanta.	1	Geo. Edwards.....	Atlanta.
Briley.	Byron Manier.....	Big Rock*	10	George Stevens.....	Atlanta.
Hillman.	William Grice.....	Hillman*	No.	William Grice.....	Hillman.*

STATE HIGHWAY DEPARTMENT

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served	Attended road institute.	Highway Commissioner	Post Office Address.
MONTWENY CO. - Con.						
Montmorency.....	Joseph Laffender.....	Royston.....	1	Yes.....	Reinhold Werner.....	Royston.
Rust.....	Wm. H. Draper.....	Hillman.....	1	Yes.....	Abraham Wing.....	Hillman.
Vienna.....	Alonzo Manier.....	Big Rock*.....	9	Yes.....	Alonzo Manier.....	Big Rock.*
MUSKEGON COUNTY:						
Blue Lake.....	John F. Davis.....	Whitehall*.....	2	Yes.....	John F. Davis.....	Whitehall.*
Casnovia.....	Wm. Hibbs.....	Bailey, R. D. 1*.....	2	Yes.....	Wm. Hibbs.....	Bailey, R. D. 1.*
Cedar Creek.....	John Sweetser.....	Twin Lake.....	3	Yes.....	John Sweetser.....	Holton, R. D. 2.
Dutton.....	Peter Wiersma.....	Muskegon, R. D. 2.....	2	Yes.....	Victor Schmitt.....	Twin Lake.
Eggleston.....	John Edsall.....	Muskegon, R. D. 4*.....	2	Yes.....	John Edsall.....	Muskegon, R. D. 4, Box 70*
Fruitland.....	Bert Iverson.....	North Muskegon, R. D. 8*.....	2	Yes.....	Bert Iverson.....	Muskegon, R. D. 8.*
Fruitport.....	Hubby J. Curtiss.....	Fruitport*.....	9	Yes.....	Hubby J. Curtiss.....	Fruitport.*
Holton.....	S. C. Cosens.....	Holton.....	3	Yes.....	Oscar Martin.....	Holton.
Laketon.....	John Baars.....	North Muskegon, R. D. 2*.....	5	Yes.....	John Baars.....	No. Muskegon, R. D. 3.*
Montague.....	Maurice O'Connell.....	Montague, R. D. 3*.....	8	Yes.....	Maurice O'Connell.....	Montague.
Moorland.....	Henry J. Smilling.....	Moorland*.....	1	No.....	Henry J. Smilling.....	Moorland.*
Muskegon.....	Geo. W. Jenks.....	Muskegon, R. D. 4.....	7	Yes.....	Geo. W. Jenks.....	Muskegon, R. D. 4.*
Norton.....	Jacob Bosma.....	Muskegon, R. D. 1.....	3	Yes.....	Charles Poland.....	Muskegon, R. D. 7.
Ravenna.....	John A. Price.....	Ravenna, R. D. 3*.....	9	Yes.....	John A. Price.....	Ravenna, R. D. 3.*
Sullivan.....	Thomas Hinsley.....	Coopersville, R. D. 4.....	3	Yes.....	Thomas Hinsley.....	Coopersville, R. D. 4.*
Whitehall.....	Henry R. Klett.....	Whitehall*.....	3	Yes.....	Henry R. Klett.....	Whitehall.*
White River.....	Wm. J. Coors.....	Montague*.....	7	Yes.....	Herman Lecus.....	Montague, R. D. 5.
NEWAYGO COUNTY:						
Ashland.....	Hugh Renney.....	Grant, R. D. 2*.....		No.....	Warren Woods.....	Grant.
Barton.....	Robert E. Eichenberg.....	Reed City, R. D. 2*.....		No.....	R. E. Eichenberg.....	Reed City, R. D. 2.*
Beaver.....	James Sherrod.....	Hesperia, R. D. 5.....		No.....	James W. Sherrod.....	Hesperia, R. D. 5.*
Big Prairie.....	Homier Truesdale.....	Holton*.....	2	Yes.....	Homier Truesdale.....	Croton.*
Bridgeton.....	Henry E. Zerlaut.....	Croton*.....		No.....	Henry E. Zerlaut.....	Holton.*
Brooks.....	John J. Peterson.....	Newaygo*.....	3	Yes.....	Edwin M. Schick.....	Newaygo.
Croton.....	Philip Brant.....	Croton*.....	2	Yes.....	Philip Brant.....	Croton.*
Dayton.....	Elsha P. Lare.....	Fremont, R. D. 6*.....		No.....	Joseph Pearson.....	Fremont.*
Denver.....	William H. Bulson.....	Fremont, R. D. 2*.....	2	Yes.....	Wm. H. Bulson.....	Fremont, R. D. 2.*
Enslay.....	Preston M. Roberts.....	Sand Lake, R. D. 36*.....	1	Yes.....	P. M. Roberts.....	Sand Lake, R. D. 36.*
Everett.....	Thomas H. Terwilliger.....	White Cloud, R. D. 3*.....	2	Yes.....	Wm. Eaves.....	White Cloud.
Garfield.....	Michael Moses.....	Newaygo.....	9	Yes.....	Michael Moses.....	Newaygo.*
Goodwell.....	John Johnson.....	Woodville.....	1	Yes.....	Christ Nestle.....	White Cloud.
Grant.....	Albert Osborn.....	Grant, R. D. 3*.....	2	Yes.....	Hiram Walters.....	Grant, R. D. 3.
Home.....	Charles Hickey.....	Lilley*.....	2	Yes.....	William H. Emerson.....	Lilley.
Lincoln.....	Thomas Kelly.....	White Cloud, R. D. 1.....	2	Yes.....	Thomas Kelly.....	White Cloud.*
Monroe.....	Frank Watts.....	Otia.....	3	Yes.....	Frank Watts.....	Otia.*
Norwich.....	John Johnson.....	Woodville, R. D. 3*.....	6	Yes.....	Wm. Modrow.....	Woodville, R. D. 1.

Sheridan.....	George R. Warren.....	Fremont.....	1	Yes.....	Geo. R. Warren.....	Fremont, R. D. 3.*
Sherman.....	Henry A. Mayo.....	Fremont, R. D. 4.*	.....	No.....	Henry A. Mayo.....	Fremont, R. D. 4.*
Troy.....	Willis Morduff.....	Walkerville, R. D. 1, Bx 51.	.....	No.....	Ira Olds.....	Walkerville, R. D. 1.
White Lake.....	Moses D. Troyer.....	White Cloud.....	1	Yes.....	Hiram Eldred.....	White Cloud.....
OAKLAND COUNTY:						
Addison.....	Bert Layton.....	Orion*.....	2	Yes.....	Bert Layton.....	Orion*.....
Avon.....	Edward A. Tucker.....	Rochester, R. D. 1.....	1	Yes.....	Edward A. Tucker.....	Rochester*.....
Bloomfield.....	Geo. H. Fowler.....	Pontiac.....	2	Yes.....	Geo. H. Fowler.....	Pontiac, R. D.*.....
Branton.....	Frederick Bennett.....	Orionville.....	1	Yes.....	William B. Connell.....	Orionville.....
Commerce.....	Eugene Crane.....	Milford.....	1	Yes.....	C. H. Housner.....	Walled Lake.....
Farmington.....	Charles O'Brien.....	Farmington.....	.....	No.....	Thos. Hitchcock.....	Farmington.....
Grovefield.....	John C. Starring.....	Clarkson*.....	2	Yes.....	F. W. Thayer.....	Orionville, R. D. 2.....
Highland.....	O. P. Leonard.....	Clyde, R. D. 1.....	1	Yes.....	Oliver P. Leonard.....	Highland*.....
Holly.....	Fred M. Haddon.....	Holly, R. D. 3.....	4	Yes.....	Chas. H. Spaulding.....	Holly, R. D. 2.....
Independence.....	Geo. B. Fleming.....	Clarkson*.....	2	Yes.....	Wm. H. Blizard.....	Clarkston.....
Lyon.....	Clayton E. Deake.....	Salen.....	1	Yes.....	Albert E. Bullock.....	South Lyon.....
Milford.....	Palmer J. Heath.....	Milford*.....	.....	No.....	Bradley T. Nicholson.....	Milford.....
Novi.....	Grant Putnam.....	Novi.....	1	Yes.....	Grant Putnam.....	Novi*.....
Oakland.....	Albert Sine.....	Leonard*.....	6	Yes.....	Albert Sine.....	Leonard, R. D.*.....
Oxford.....	Samuel C. Axford.....	Orion.....	1	Yes.....	Samuel C. Axford.....	Orion*.....
Pontiac.....	Neil Young.....	Oxford*.....	3	Yes.....	W. I. Nash.....	Oxford.....
Rose.....	Wm. Anderson.....	Pontiac, R. D. 4.*.....	1	Yes.....	William Anderson.....	Pontiac, R. D. 4.*.....
Royal Oak.....	Edwin J. Forsyth.....	Holly, R. D. 4.....	3	Yes.....	Noble C. Arnold.....	Holly, R. D. 4.....
Southfield.....	Joseph Starch.....	Royal Oak*.....	2	Yes.....	Joseph Starch.....	Royal Oak*.....
Springfield.....	Stephen A. Wright.....	Redford, R. D. 4.*.....	3	Yes.....	Richard Curran.....	Redford, R. D. 4.....
Troy.....	Isaiah Hall.....	Davison*.....	10	Yes.....	Charles McBratney.....	Davison.....
Waterford.....	Charles Baker.....	Clarkson*.....	3	Yes.....	Charles Baker.....	Clarkson.....
West Bloomfield.....	Miles G. Cole.....	Pontiac*.....	3	Yes.....	Frank Noyke.....	Pontiac, R. D. 5.....
White Lake.....	Arthur M. Young.....	Orchard Lake, R. D. 1.....	1	Yes.....	John A. Boughner.....	Orchard Lake.....
	James P. Seamark.....	Pontiac, R. D. 2.*.....	2	Yes.....	Elmer Farrell.....	Milford.....
OCEANA COUNTY:						
Benona.....	Henry F. Baade.....	Shelby, R. D. 2.*.....	.....	No.....	Thos. J. Kelly.....	Shelby, R. D. 2.....
Clay Banks.....	Ell B. Bae.....	Montague, R. D. 1.*.....	.....	No.....	E. B. Bae.....	Montague, R. D. 1.*.....
Colfax.....	Albert Fletcher.....	Walkerville, R. D. 1.....	.....	No.....	W. E. Rush.....	Walkerville, R. D. 2, Bx 98.....
Crystal.....	C. C. Jones.....	Hart, R. D. 2.....	3	Yes.....	Geo. W. Kelley.....	Hart, R. D. 2.....
Elbridge.....	Monroe G. Hall.....	Hart, R. D. 4.....	.....	No.....	Monroe G. Hall.....	Hart*.....
Ferry.....	Alvin M. Decker.....	Ferry, R. D. 2.....	5	Yes.....	A. M. Decker.....	Ferry*.....
Golden.....	Orla M. Wright.....	Mears*.....	3	Yes.....	Fred A. Urtel.....	Mears, R. D. 1.....
Grant.....	John Kiel.....	Rothbury, R. D. 1.....	1	Yes.....	John Kiel.....	Rothbury*.....
Greenwood.....	Fred Phelps.....	Hesperia.....	.....	No.....	Lewland Poe.....	Hesperia.....
Hart.....	John A. Billings.....	Hart*.....	.....	No.....	John A. Billings.....	Hart*.....
Leavitt.....	John Ruby.....	Walkerville*.....	3	Yes.....	John Ruby.....	Walkerville, R. D. 3.....
Newfield.....	Thomas Kennedy.....	Hesperia*.....	2	Yes.....	Ernest C. Latthin.....	Hesperia.....
Otto.....	L. A. Ward.....	Ferry*.....	6	Yes.....	Herman F. Newman.....	Hesperia.....
Pentwater.....	Sylvester E. Russell.....	Pentwater*.....	.....	No.....	Frank Maynard.....	Pentwater.....
Shelby.....	Joseph W. Rears.....	Shelby*.....	2	Yes.....	Joseph W. Rears.....	Shelby*.....
Wear.....	Palmer E. Buck.....	Pentwater*.....	.....	No.....	Henry Claeys.....	Hart, R. D. 2.....
OSHTAW COUNTY:						
Churchill.....	W. R. Hillier.....	Selkirk.....	1	Yes.....	W. R. Hillier.....	Selkirk*.....
Cunning.....	Wm. Delaney.....	Rose City, R. D. 1.*.....	1	Yes.....	John Newbecker.....	Rose City.....
Edwards.....	Wm. Longstrath.....	West Branch.....	1	Yes.....	Wm. Longstrath.....	West Branch, R. D. 2.*.....

STATE HIGHWAY DEPARTMENT

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner.	Post Office Address.
OCEOLA COUNTY.— <i>Con.</i>	Jos. W. Wright.....	Damon.....	1	No.	Jos. W. Wright.....	Damon.*
	William Vaughan.....	Malby.....		Yes.	Wm. Vaughan.....	Malby.*
	George Short.....	Eliak.....		No.	Wm. Barber.....	Eliak.
	Jacob Becker.....	Wester Branch, R. D. 1*.	1	Yes.	Jacob Becker.....	Alger.*
	John Klacking.....			No.	Frank W. Reetz.....	Rose City.
	Eugene Hinkley.....	Nester.....	4	Yes.	F. B. McKenney.....	Nester.*
	Wm. Henry.....	Prestcott.*		No.	Wm. Henry.....	Prestcott.*
	Martin Lupton.....	West Branch.....		No.	Martin Lupton.....	Lupton.*
	Harry Robinson.....			No.	A. J. Diebold.....	West Branch.
	Erick M'lymaki.....	Rubicon.....			Erick M'lymaki.....	Rubicon.*
	Gordon McLain.....	Ontonagon*.....			Gordon McLain.....	Ontonagon.*
	John P. Driscoll.....	Greenland*.....			Almore Penegar.....	Greenland.*
	James Bishop.....	Bruce Crossing			James Bishop.....	Roselawn.*
ONTONAGON COUNTY:	Frank H. Hayward.....	Trout Creek.....			Frank H. Hayward.....	Trout Creek.*
	A. J. Hoskins.....	Balentine.....			A. J. Hoskins.....	Balentine.*
	Joseph Wolfe.....	Ewen*.....			Joseph Wolfe.....	Ewen.*
	William Anglim.....	Ontonagon*.....			William Anglim.....	Ontonagon.*
	Joseph Verville.....	Rockland.....			Joseph Verville.....	Rockland.*
	John Anderson.....	Bruce Crossing			William Bateman.....	Paynesville.
	August Anderson.....	Tustin, R. D. 1*.	1	No.	August Anderson.....	Tustin, R. D. 1.* Box 85
	Ralph Houdley.....	Le Roy, R. D. 3.	1	Yes.	Ralph Houdley.....	Le Roy, R. D. 3.*
	George Snyder.....	Ewart.....		Yes.	Silas Hooges.....	Ewart.
	Alva Vanderhoof.....	Hartwick*.....		No.	Matthew McDonald.....	Le Roy, R. D. 2.
	John Vance.....	Hersey*.....	1	Yes.	John Vance.....	Hersey.*
	Wm. Bentley.....	Marion, R. D. 3.	1	Yes.	Wm. Bentley.....	Ina.*
	Nels Hedberg.....	Le Roy*.....		No.	Chas. Nelson.....	Le Roy.
OSCEOLA COUNTY:	Lorenzo W. Purchase.....	Orono.....	2	No.	L. W. Purchase.....	Orono.*
	Acy Cole.....	Marion, R. D. 3*.	7	Yes.	Eugene Rennells.....	Marion.
	W. W. Cushman.....	Marion, R. D. 1.	2	Yes.	James I. Bell.....	Marion, R. D. 1.
	J. A. Wymer.....	Sears, R. D. 1*.	2	Yes.	Joseph A. Wymer.....	Sears.*
	Fred Diehlman.....	Ewart, R. D. 3*.	4	Yes.	Fred Diehlman.....	Ewart, R. D. 3.*
	Dan L. Frank.....	Reed City.....	1	Yes.	Dan L. Frank.....	Reed City.*
	Herbert A. Sindall.....	Le Roy*.....	2	Yes.	John Loftquist.....	Le Roy.
	Charles Peterson.....	Tustin, R. D. 2*.	2	Yes.	Charles Peterson.....	Tustin.*
	Philip Orth.....	Sears.....	1	Yes.	P. H. Orth.....	Sears.*

OSCEOLA COUNTY:		G. F. Stitts.....	Mio.....	Yes.....	Charles Comstock..... P. H. Edie..... L. W. Miller..... James Galbraith..... Samuel G. Beiden.....	Luzerne..... Comins*..... Kneeland..... Mio. Box 122..... South Branch.*
Big Creek.....	Isiah Seidner.....	Fair View.....		Yes.....		
Clinton.....	Will K. Hunt.....	Red Oak.....		Yes.....		
Comins.....	S. G. Belden.....	South Branch.....		No.....		
Elmer.....						
Mentor.....						
OSCEOLA COUNTY:		Adm. W. Harrington.....	3	Yes.....	Adm. W. Harrington.....	Gaylord*.....
Bagley.....	George Giguac.....	Gaylord*.....		No.....	George Giguac.....	Johannesburg*.....
Barlow.....	Joseph Dezler.....	Gaylord*.....	2	Yes.....	Joseph Dezler.....	Quick.....
Chesler.....	Henry Kane.....	Vanderbilt*.....	1	Yes.....	Henry Kane.....	Vanderbilt*.....
Crooketh.....	Harmen Ploot.....	Gaylord.....		No.....	Henry Deibelholter.....	Gaylord.....
Dover.....	Gustave F. Roselma.....	Elmira.....	12	No.....	Frank P. Graze.....	Elmira.....
Elmira.....	Nelson Harrison.....	Gaylord*.....	3	Yes.....	Adam Thumm.....	Gaylord.....
Haves.....	Wm. T. Williams.....	Gaylord, R. D. 3*.....		No.....	Wm. Peck.....	Gaylord.....
Livinston.....		Waters*.....		Yes.....	Wm. T. Williams.....	Waters*.....
Osceola Lake.....						
OTTAWA COUNTY:		John S. Thayer.....		No.....	Fred Knoper.....	Jenison, R. D. 1.....
Allendale.....	John Marlink.....	Allendale.....		Yes.....	Bourke Hofman.....	Hudsonville.....
Blendon.....	Harrison T. Barrett.....	Zeeland, R. D. 2.....	1	No.....	Harrison T. Barrett.....	Kent City*.....
Chester.....	Oliver Gleason.....	Kent City*.....		Yes.....	Oliver Gleason.....	Nunda.....
Crocker.....	John M. Quigley.....	Nunda*.....	17	Yes.....	John M. Quigley.....	Grandville*.....
Georgetown.....	Charles Heide.....	Grandville*.....	8	Yes.....	Charles Heide.....	Agnew*.....
Grand Haven.....	Johannes De Haan.....	Agnew*.....	3	Yes.....	Johannes De Haan.....	Roland, R. D. 7*.....
Holland.....	John H. De Weerd.....	Holland, R. D. 7*.....	1	Yes.....	John H. De Weerd.....	Janestown.....
Jameson.....	Henry Siersma.....	Holland, R. D. 10*.....		No.....	Henry Siersma.....	Roland, R. D. 10*.....
Oliver.....	Charles Himmelberger.....	Coopersville*.....		No.....	Charles Himmelberger.....	Coopersville*.....
Polkton.....	Wm. Foster.....	Robinson*.....		No.....	William Foster.....	Robinson*.....
Robinson.....	Thos. Hammond.....	Spring Lake*.....	3	Yes.....	Thomas Hammond.....	Spring Lake*.....
Spring Lake.....	John Burdick.....	Spring Lake*.....	2	Yes.....	John Burdick.....	Lamont*.....
Talmadge.....	Frank Knauf.....	Lamont.....		Yes.....	Orren McClure.....	Berlin.....
Wright.....	Jacob De Koster.....	Zeeland, R. D. 1*.....	1	Yes.....	John De Hoop.....	Vriesland.....
Zeeland.....						
PRESQUE ISLE COUNTY:		A. C. Robinson.....	1	Yes.....	A. C. Robinson.....	Onaway*.....
Allis.....	George Cole.....	Onaway.....		No.....	Jacob J. Erb.....	Grace.....
Beainger.....	Louis Schram.....	Grace*.....		No.....	Louis Schram.....	Meiz*.....
Belknap.....	Louis Uriaub.....	Meiz*.....		Yes.....	Louis Uriaub.....	Hawks*.....
Bismarck.....	L. R. Van Guilder.....	Hawks.....	1	No.....	Gus Lang.....	Millersburg.....
Case.....	John Ziowski.....	Millersburg.....		No.....	Wm. Wide.....	Bolton.....
Krakow.....	Pete Manlyck.....	Posen.....	1	Yes.....	Pete Manlyck.....	Meiz*.....
Metz.....	Fred Schack.....	Metz.....	1	Yes.....	Herman Karsten.....	Rogers City.....
Moltke.....	John Hall.....	Rogers City.....		No.....	Christophar Miller.....	Onaway.....
North Allis.....	Fred King.....	Onaway*.....		No.....	Louis Miller.....	Osceoc.....
Osceoc.....	Hugh King.....	Osceoc.....	1	Yes.....	John Nowak, Jr.....	Posen.....
Posen.....	Peter Pural.....	Posen.....	1	Yes.....	Nelson Rabiteau.....	Posen.....
Presque Isle.....	Nelson Rabiteau.....	Posen.....	12	Yes.....	Robert Sheika.....	Posen.....
Pulawski.....	John Jarnez.....	Posen.....	1	Yes.....	Edward Kelschnick.....	Rogers City*.....
Rogers.....	Edward Kelschnick.....	Rogers City.....		No.....		

STATE HIGHWAY DEPARTMENT

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner	Post Office Address.
ROSCOMMON Co.:	Denton.....	Prudenville**.			Simeon Dowell.....	St. Helen.
	Gerrish.....	Roscommon.....			George Parrott.....	Roscommon.*
	Higgins.....	John Coleman.....			George L. Oliver.....	Markey.
	Markey.....	David Burleson.....			Daniel Wells.....	Nolan.*
	Nester.....	C. H. Janzen.....			Cornelius H. Janzen.....	St. Helens.*
	Richfield.....	Joseph Carter.....			Joseph Carter.....	Houghton Lake.*
	Roscommon.....	William Nestell.....			William Nestell.....	
SAGINAW COUNTY:	Albee.....	Burt, R. D. 1*.....	4	Yes.	Henry E. Shaft.....	Burt, R. D. 1.*
	Birch Run.....	Birch Run*.....	1	No.	Charles S. Dewey.....	Birch Run.*
	Blumfield.....	Saginaw, R. D. 3.....	6	Yes.	Louis Schoenknicht.....	Saginaw, R. D. 3.*
	Brady.....	Chesaning, R. D. *.....	1	Yes.	Frank Tule.....	Chesaning.
	Brant.....	Brant.....	10	Yes.	John Jennings.....	Brant.*
	Bridgeport.....	Saginaw, R. D. 6.....	1	Yes.	H. C. Buckhardt.....	Saginaw, R. D. 6.*
	Buena Vista.....	Buena Vista, R. D. 1, 15, An- Carrollton.....	1	Yes.	A. Konteozka.....	Saginaw, E. S., R. D. 1.*
	Carrollton.....	Carrollton.....	1	Yes.	Stephen Konteozka.....	Carrollton.*
	Chapin.....	Elsie, R. D. 21.....	1	Yes.	Stephen Konteozka.....	Elsie.
	Chesaning.....	Chesaning.....	4	Yes.	Levi Baker.....	Chesaning.*
	Frankenmuth.....	Frankenmuth, R. D. 2*.....	1	Yes.	Daniel Detwiler.....	Frankenmuth, R. D. 2.*
	Fremont.....	St. Charles, R. D. 1*.....	2	Yes.	George L. Roedel.....	St. Charles, R. D. 1.*
	James.....	Saginaw, R. D. 10*.....	4	Yes.	Dan M. McKay.....	Saginaw, R. D. 10.*
	Jonesfield.....	Merrill, R. D. 5*.....	4	Yes.	Anthony Papst.....	Merrill.
	Kochville.....	Saginaw, R. D. 11*.....	4	Yes.	Elmer Massie.....	Saginaw, R. D. 12.
	Lakefield.....	Merrill, R. D. 4*.....	4	No.	William Rugenstein.....	Merrill.*
	Maple Grove.....	New Lothrop*.....	4	Yes.	John J. Simonson.....	Burt, R. D. 2, Box 32.
	Marion.....	Brant, R. D. 3*.....	4	No.	Ellis Vincent.....	Brant, R. D. 3.*
	Richland.....	Henlock, R. D. 1*.....	2	Yes.	Richard Fischer.....	Henlock, R. D. 3.*
	Saginaw.....	Saginaw, R. D. 12*.....	4	Yes.	Fred Wardin.....	Saginaw, R. D. 12.*
	Springfield.....	Saginaw, R. D. 7.....	1	Yes.	John G. Egner.....	Saginaw, R. D. 7.*
	St. Charles.....	St. Charles.....	7	Yes.	Peter Girard.....	St. Charles, R. D., Box 21.
	Swan Creek.....	Henlock, R. D. 4*.....	4	Yes.	H. Marion Richmond.....	Henlock, R. D. 4.*
	Thomastown.....	Burt.....	1	Yes.	John Stolz.....	Henlock, R. D. 5.*
	Titabawassee.....	Henlock, R. D. 5.....	20	Yes.	Charles A. Frost.....	Henlock, R. D. 5.*
	Zilwaukee.....	Zilwaukee.....	4	Yes.	Frederick Freeland.....	Zilwaukee.
					John Paton.....	
SANILAC COUNTY:	Argyle.....	Argyle*.....	3	Yes.	Jacob Spencer.....	Shabbona, R. D. 1.
	Austin.....	Roderic McDonald.....	1	Yes.	Rod McDonald.....	Tyre, R. D. 1.*
	Bridgechampion.....	Carsonville, R. D. 1*.....	2	Yes.	John Kirkpatrick.....	Deckerville, R. D. 4.
	Buel.....	Melvin, R. D. 4.....	2	Yes.	Edwin Francis.....	Croswell, R. D. 2.

Custer.....	Merton Hulshander.....	Yes.	2	McGregor, R. D. 1*.....	McGregor, R. D. 1*.....
Delaware.....	Jas. Cox.....	Yes.	12	Peck*.....	Minden City, Star route.*
Elk.....	Geo. Kemp.....	No.		Clark*.....	Minden, R. D. 4.....
Elmer.....	Clark Rupp.....	Yes.	4	Sandusky, R. D. 1.....	Sandusky, R. D. 4.....
Evergreen.....	Im. Howe*.....	Yes.	1	Shabbona, R. D. 1.....	Shabbona, R. D. 1*.....
Flynn.....	William Stephenson.....	Yes.	1	Marlette, R. D. 3.....	Marlette, R. D. 3*.....
Forester.....	Joseph A. McCully.....	No.		Deckerville, R. D. 4.....	Deckerville, R. D. 4*.....
Fremont.....	William Wilson.....	Yes.	4	Yale, R. D. 5*.....	Crossville, R. D. 1*.....
Greenleaf.....	Robert Fuester.....	Yes.	2	Chamber*.....	Cumbar, R. D. 4.....
Lamotte.....	William Frennatt.....	Yes.	6	Shabbona, R. D. 4*.....	Shabbona, R. D. 4*.....
Lexington.....	William Schoettle.....	Yes.	3	Crossville, R. D. 4*.....	Crossville, R. D. 4*.....
Maple Valley.....	Michael Rogan.....	No.		Brown City, R. D. 5.....	Brown City, R. D. 2.....
Marion.....	Jas. Coleman.....	Yes.	3	Deckerville, R. D. 1*.....	Deckerville, R. D. 2.....
Marlette.....	James Conbrane.....	Yes.	4	Marlette.....	Marlette, R. D. 3*.....
Minden.....	Vincent Swiercz.....	Yes.	1	Minden City*.....	Minden City*.....
Moore.....	John Eddy.....	Yes.	1	Sandusky.....	Sandusky*.....
Sanlac.....	Michael Devenaux.....	No.		Port Sanlac, R. D. 1.....	Port Sanlac.....
Speaker.....	Joseph Kerr.....	Yes.	2	Melvin, R. D. 3.....	Melvin, R. D. 2.....
Washington.....	George M. Turnbull.....	Yes.	2	Carsonville*.....	Carsonville*.....
Watertown.....	David Carney.....	Yes.	1	Sandusky*.....	Sandusky*.....
Whiteland.....	C. B. Mercer.....	Yes.		Deckerville.....	Deckerville, R. D. 5*.....
Worth.....	James Stewart.....	No.		Amadore.....	Deckerville, R. D. 5*.....
SCHOOLCRAFT COUNTY:					
Cusino.....	Peter Myren.....			Cusino.....	Cusino*.....
Doyle.....	Judge Sweet.....			Gulliver.....	Manistique.....
Germfask.....	Geo. Guitam.....			Germfask*.....	Germfask.....
Hiawatha.....	John D. Ryers.....			Hiawatha.....	Manistique.....
Inwood.....	George Roberts.....			Cooks*.....	Cooks*.....
Manistique.....	William Magnuson.....			Manistique, R. D. 1*.....	Manistique, R. D. 1*.....
Mueller.....	Fred W. Bunker.....			Blaney*.....	Blaney*.....
Seney.....	John E. Hancock.....			Seney*.....	Seney*.....
Thompson.....	Edward McRitchie.....			Thompson.....	Thompson*.....
SHIAWASSEE COUNTY:					
Antrim.....	Henry Hansen.....		3	Bancroft*.....	Bancroft.....
Bennington.....	Chas. J. Tasee.....		2	Owosso, R. D.*.....	Owosso, R. D. 3, Box 96.....
Burns.....	George H. Eddy.....	No.		Byron*.....	Byron*.....
Caledonia.....	Ray Newell.....	Yes.	1	Corunna, R. D. 1*.....	Corunna, R. D. 1*.....
Fairfield.....	Lae Head.....	Yes.	7	Burton, R. D. 1*.....	Burton, R. D. 1*.....
Hazleton.....	James McEachen.....	No.		New Lothrop*.....	New Lothrop*.....
Middlebury.....	John A. McKenzie.....	Yes.	7	Owosso, R. D. 5.....	Owosso, R. D. 5*.....
New Haven.....	Charles F. Hartman.....	Yes.	1	Owosso, R. D. 2, Box 67.....	Owosso, R. D. 2, Box 67*.....
Owosso.....	August F. Stewart.....	Yes.	2	Owosso, R. D. 6*.....	Owosso, R. D. 6*.....
Perry.....	E. A. Burke.....	Yes.	2	Perry*.....	Perry*.....
Rush.....	James King.....	Yes.	2	Owosso, R. D. 6*.....	Owosso, R. D. 6*.....
Sciota.....	Oren J. Leland.....	Yes.	1	Ovid, R. D. 16.....	Ovid, R. D. 16*.....
Shiawassee.....	R. B. Hutchings.....	Yes.	1	Bancroft.....	Bancroft.....
Venon.....	John Harmon.....	Yes.	1	Corunna, R. D.*.....	Corunna, R. D.*.....
Vernon.....	Linus Leetch.....	Yes.	3	Durand.....	Durand*.....
Woodhull.....	A. A. Spangler.....	Yes.	3	Shafsbury*.....	Shafsbury*.....

STATE HIGHWAY DEPARTMENT

TOWNSHIP HIGHWAY COMMISSIONERS.—Continued.

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner.	Post Office Address.
ST. CLAIR COUNTY:						
Berlin.....	Claude Wyman.....	Berville, R. D. 1*.....	2	No.....	Claude Wyman.....	Berville.*
Brookway.....	J. H. Young.....	Yale, R. D. 2*.....	1	Yes.....	Joshua H. Young.....	Yale, R. D. 2.*
Burchville.....	D. G. Bowman.....	North Street*.....	1	No.....	D. G. Bowman.....	North Street.*
Casco.....	John Rewaldt.....	Adair, R. D. 1.....	2	Yes.....	Henry C. Duetsch.....	Adair.
China.....	Fred Walter.....	Marine City*.....	14	Yes.....	Fred Walters.....	Marine City, R. D. 1.*
Clay.....	Chas. McComb.....	Algonac, R. D. 1*.....	14	Yes.....	Chas. McComb.....	Algonac, R. D. 1.*
Columbia.....	Dwight Beard.....	Atkins, R. D. 2*.....	4	Yes.....	David Beard.....	Atkins.*
Cottleville.....	Orwin Fenton.....	Richmond*.....	9	Yes.....	Orwin Fenton.....	Richmond.*
East China.....	Alex. Atwell.....	Algonac.....	1	Yes.....	E. Burton Hill.....	Fair Haven, R. D.
Emmet.....	John A. McDonald.....	Marine City.....	1	No.....	Dennis McNeerney.....	Marine City.
Fort Gratiot.....	Dennis McNeerney.....	Emmet, R. D. 4*.....	1	Yes.....	Phil Freiger.....	Emmet, R. D. 4.*
Grant.....	Henry Gough.....	Port Huron, R. D. 1.....	4	Yes.....	Wm. Henry Gough.....	Port Huron, R. D. 1.*
Greenwood.....	Donald J. Black.....	Blaine.....	2	Yes.....	Donald J. Black.....	Blaine.*
Irma.....	Theodore Meyers.....	Avoca*.....	5	Yes.....	Donald Sauryuk.....	Avoca.*
Kenockee.....	Carl Seifert.....	Fair Haven*.....	1	Yes.....	Carl Seifert.....	Fair Haven.
Kinnail.....	Joseph Benschow.....	Abbotsford, R. D. 1*.....	1	Yes.....	John Hodges.....	Abbotsford, R. D. 1.*
Lynn.....	Wm. Meikle.....	Port Huron.....	1	Yes.....	John Hodges.....	Smiths Creek, R. D. 2.
Mussey.....	James Burr.....	Yale, R. D. 1.....	2	Yes.....	William H. Meikle.....	Yale.*
Port Huron.....	John W. Minor.....	Capac, R. D. 1.....	3	Yes.....	Capac, R. D. 1, Box 67.	Capac, R. D. 1, Box 67.
Riley.....	Edward Stinson.....	Port Huron*.....	1	Yes.....	John W. Minor.....	Port Huron, R. D. 2.*
St. Clair.....	Joseph Meyers.....	Memphis, R. D. 3*.....	1	Yes.....	William Dingman.....	Ellet Centre.
Wales.....	James Campbell.....	St. Clair, R. D. 3.....	1	No.....	Joseph E. Meyers.....	St. Clair, R. D. 3.*
		Goodells*.....			Albert Raven.....	Memphis.
ST. JOSEPH COUNTY:						
Burr Oak.....	Edward H. Hagadorn.....	Sturgis*.....		No.....	Jay Lancaster.....	Burr Oak.
Colon.....	A. Sinclair.....	Colon, R. D. 2.....		No.....	S. K. McMillan.....	Colon.
Constantine.....	Charles W. Burger.....	Constantine*.....		No.....	Levi Kemmer.....	Constantine.
Fabius.....	Albert Z. Miller.....	Three Rivers*.....		No.....	Albert Z. Miller.....	Three Rivers.*
Fawn River.....	Frederick Carls.....	Sturgis, R. D. 6.....		No.....	Frederick Carls.....	Sturgis.*
Flowerfield.....	Benjamin Wade.....	White Pigeon, D. 3*.....		No.....	Benjamin C. Wade.....	White Pigeon.*
Florida.....	Fred C. Holmes.....	Marcellus, R. D. 2.....		No.....	Fred C. Holmes.....	Marcellus, R. D. 3.*
Lockport.....	Emmet E. Thomas.....	Leonidas, R. D. 2.....		No.....	E. E. Thomas.....	Leonidas.*
Mendon.....	G. Snyder.....	Three Rivers.....	3	Yes.....	Edwin Grosskunze.....	Three Rivers.
Mottville.....	David T. Riley.....	Mendon.....		No.....	Martin Klein.....	Mendon.
Nottawa.....	George S. Linebach.....	White Pigeon.....		No.....	W. H. Weekes.....	White Pigeon.
Park.....	A. W. Stadden.....	Centerville*.....	3	Yes.....	Geo. W. Palmer.....	Wasepi.
Sherman.....	Chas. Carvell.....	Vicksburg.....		No.....	David H. Lomison.....	Three Rivers.
Sturgis.....	John H. Burgwald.....	Sturgis*.....		No.....	Frank Cook.....	Sturgis, R. D. 3.
White Pigeon.....	George Bogen.....	Sturgis.....		No.....	W. W. Weatherwax.....	Sturgis.
	Charles Bakeman.....	White Pigeon*.....		No.....	Chas. Bakeman.....	White Pigeon.*

Enterprise.....	John H. Voss.....	Star City*.....	No.....	D. D. Wiggins.....	Star City.....
Forest.....	John Gillows.....	Morey.....	No.....	John Gillows.....	Morey*.....
Lake.....	John Armstrong.....	Lake City, Box 25*.....	4.....	C. J. Jackson.....	Lake City.....
Lake City.....	William Minard.....	Moorestown.....	No.....	William Cartwright, Jr.....	Moorestown.....
Norwich.....	Edwin Weiss.....	Morey.....	No.....	George H. McBrien.....	Morey.....
Pioneer.....	Edward Gaffney.....	Lake City*.....	2.....	Clarence Milligan.....	Lake City.....
Reeder.....	John Scholten.....	Lucas.....	No.....	Jacob Heenigman.....	Lucas.....
Richland.....	Fred A. Rowe.....	Galt.....	No.....	Isaac Burkett.....	Galt.....
Riverside.....	Owen McMahon.....	Cutcheon.....	No.....	Albert Sheldon.....	Missaukee.....
West Branch.....					
MONROE COUNTY:					
Ash.....	W. L. Hause.....	Carleton*.....	8.....	Hank Asam.....	Carleton.....
Bedford.....	Rufus Spotts.....	Temperance.....	2.....	Rufus Spotts.....	Temperance*.....
Berlin.....	Jacob F. Renner.....	Newport*.....	No.....	Joseph Valiquette.....	South Rockwood.....
Dundee.....	Thomas Hall.....	Dundee*.....	3.....	Thomas Hall.....	Dundee*.....
Erie.....	Eli Jacobs.....	Erie*.....	9.....	Moses Evans.....	Erie.....
Exeter.....	Paul Steffes.....	Scofield.....	1.....	Paul Steffes.....	Scofield*.....
Frenchtown.....	Frank F. Roberts.....	Monroe, R. D. 4*.....	4.....	Albert Stoddard.....	Monroe.....
Ida.....	William Wittkop.....	Ida, R. D. 2.....	1.....	William Wittkop.....	Ida, R. D. 2*.....
La Salle.....	John R. Lessey.....	La Salle.....	1.....	John R. Lessey.....	La Salle.....
London.....	Andrew Muehleisen.....	Maybee.....	1.....	Andrew J. Muehleisen.....	Maybee*.....
Landon.....	Newell Holcom.....	Milan, R. D. 1*.....	11.....	Wm. Lee.....	Milan.....
Monroe.....	Patrick Navarre.....	Monroe.....	4.....	Patrick Navarre.....	Monroe*.....
Rainville.....	Henry G. Eiders.....	Monroe, R. D. 2*.....	2.....	Fred D. Crossman.....	Monroe, R. D. 1.....
Summerfield.....	William Thompson.....	Petersburg.....	10.....	William G. Thompson.....	Petersburg*.....
Whiteford.....	David Lamb.....	Ottawa Lake.....	1.....	David J. Lamb.....	Ottawa Lake, R. D. 2*.....
MONTCALM COUNTY:					
Belvidere.....	Philip Rhoads.....	Six Lakes.....	3.....	Philip Rhoads.....	Six Lakes*.....
Bloomer.....	Marlin Grace.....	Carson City.....	1.....	Marlin Grace.....	Carson City, R. D. 2.....
Bunnell.....	Geo. Chas. Buchholz.....	Ferick.....	No.....	Albert J. Buchholz.....	Sheridan.....
Cato.....	Albert J. Buchholz.....	Lakeview, R. D. 5.....	1.....	Albert J. Buchholz.....	Lakeview*.....
Crystal.....	L. R. Phillips.....	Carson City, R. D. 1*.....	No.....	L. R. Phillips.....	Carson City, R. D. 1*.....
Day.....	Wm. Walther.....	Carson City.....	No.....	H. P. Hanson.....	McBride.....
Douglas.....	Thomas G. Crooks.....	Entrican*.....	7.....	Thomas G. Crooks.....	Entrican.....
Eureka.....	Edwin F. Tallman.....	Greenville, R. D. 4.....	1.....	George W. Perry.....	Greenville, R. D. 5.....
Evergreen.....	George H. Etterman.....	Sheridan, R. D. 2*.....	3.....	George H. Etterman.....	Sheridan, R. D. 2*.....
Fair Plain.....	Chris Larsen.....	McBride.....	1.....	Chris Larsen.....	Sheridan, R. D. 1.....
Ferris.....	Edward Swarthout.....	Edmore*.....	5.....	Eugene Hudson.....	Vestaburg, R. D. 1.....
Horne.....	John McCarthy.....	Edmore*.....	1.....	John McCarthy.....	Edmore.....
Naple Valley.....	James Ford.....	Trufant.....	2.....	James Ford.....	Trufant*.....
Montcalm.....	Julius Sieber.....	Gowen*.....	1.....	Julius Sieber.....	Trufant.....
Montcalm.....	Albert H. Brown.....	Sand Lake.....	2.....	Albert H. Brown.....	Trufant.....
Pine.....	Nels Anderson.....	Trufant, R. D. 1.....	1.....	Nels C. Anderson.....	Trufant, R. D. 1*.....
Reynolds.....	Fred H. La Barr.....	Howard City.....	2.....	Fred H. La Barr.....	Howard City*.....
Richland.....	C. M. Epstein.....	Vestaburg.....	1.....	C. M. Epstein.....	Vestaburg, R. D. 1*.....
Sidney.....	L. C. Madison.....	Sheridan, R. D. 1*.....	2.....	L. C. Madison.....	Sheridan, R. D. 1*.....
Winfield.....	James R. Feighther.....	Howard City, R. D. 3*.....	2.....	M. W. Kelsey.....	Lakeview.....
MONTMORENCY CO.:					
Albert.....	Patrick O'Donnell.....	Lewiston*.....	2.....	Patrick O'Donnell.....	Lewiston*.....
Avery.....	William Heinzman.....	Atlanta.....	1.....	Geo. Edwards.....	Atlanta.....
Briley.....	Byron Manier.....	Big Rock*.....	10.....	George Stevens.....	Atlanta.....
Hillman.....	William Grice.....	Hillman*.....	No.....	William Grice.....	Hillman*.....

TUSCOLA COUNTY:

Akron.....	William Dowling.....	Akron*.....	2	Yes.....	Homer Mead.....	Akron.....
Alber.....	James Trickey.....	Caro, R. D. 5.....	1	Yes.....	James Trickey.....	Caro, R. D. 5*
Arbela.....	Chas. McNeal.....	Millington, R. D. 4.....		No.....	James Smith.....	Vassar, R. D. 8.
Columbia.....	John Graf.....	Unionville*.....	4	Yes.....	Christopher C. Haley.....	Unionville*.....
Dayton.....	Christopher Haley.....	Silverwood, R. D. 3.....	1	Yes.....	Carl W. A. Schultz.....	Silverwood, R. D. 3, B 30.*
Denmark.....	Leonhard Rogner.....	Richville.....	3	Yes.....	P. A. Koepfgen.....	Richville.....
Elkland.....	William B. Barriger.....	Cass City*.....	3	Yes.....	William B. Barriger.....	Cass City*.....
Ellingwood.....	Charles Seelye.....	Deford, R. D. 3.....	1	Yes.....	Charles Hutchinson.....	Deford, R. D. 3.*
Fairgrove.....	John McCready.....	Gagetown, R. D. 4.....	1	Yes.....	Emanuel Petershaus.....	Caro, R. D. 4.
Fremont.....	Wm. H. Turner.....	Fairgrove*.....	2	Yes.....	Wm. H. Turner.....	Caro, R. D.
Gilford.....	John Findlay.....	Mayville*.....		No.....	Thomas Murphy, Sr.....	Mayville*.....
Indianfields.....	Jason H. Root.....	Gilford*.....		No.....	Thomas H. Root.....	Fairgrove, R. D. 2.
Junata.....	Samuel Miller.....	Caro, R. D. 2.....	8	Yes.....	Samuel Miller.....	Caro*.....
Kingston.....	Mason Leet.....	Wilnot, R. D. 1*.....	1	Yes.....	James Rossmann.....	Caro, R. D. 2.*
Koryton.....	Geo. H. Smith.....	Clifford, R. D. 1*.....		No.....	George B. Smith.....	Kingston.....
Millington.....	F. E. Rice.....	Millington, R. D. 1.....	2	Yes.....	Henry Forsythe.....	Clifford, R. D. 1.*
Novesda.....	Dugald Livingston.....	Cass City, R. D. 1, Box 87*.....	12	Yes.....	Dugald Livingston.....	Millington, R. D. 6.
Tuscola.....	Levi W. McCuth.....	Cass City, R. D. 4*.....	2	Yes.....	Levi W. McCuth.....	Cass City, R. D. 4.*
Vassar.....	Charles M. Crosby.....	Vassar, R. D. 8.....	2	Yes.....	Levi W. McCuth.....	Tuscola.....
Watertown.....	Chas. Baillor.....	Vassar*.....	2	Yes.....	William H. Brumby.....	Vassar.....
Wells.....	Robert H. Putnam.....	Mayville, R. D. 2*.....	9	Yes.....	Charles Baillor.....	Mayville, R. D. 2.*
Wiener.....	Gustav A. Lark.....	Caro, R. D. 6*.....		No.....	Archie L. Adams.....	Caro, R. D. 6.
		Akron, R. D. 3.....	1	Yes.....	Henry Ruppert.....	Akron, R. D. 3.

VAN BUREN COUNTY:

Amena.....	Herbert Salisbury.....	Paw Paw.....		No.....	H. Salisbury.....	Paw Paw*.....
Antwerp.....	John Maxwell.....	Lawton.....	1	Yes.....	John Maxwell.....	Lawton*.....
Arlington.....	Mark Burlingame.....	Lawrence.....	1	Yes.....	Mark Burlingame.....	Lawrence*.....
Bangor.....	J. M. Jackson.....	Bangor.....	6	Yes.....	James M. Jackson.....	Bangor*.....
Bloomington.....	Benjamin S. Minn.....	Bloomington*.....		No.....	Benj. S. Minn.....	Bloomington*.....
Columbia.....	Frank M. Niles.....	Breedsville*.....		No.....	Frank M. Niles.....	Breedsville*.....
Covert.....	Just Thomas Morgan.....	Covert.....	1	Yes.....	Robert Niles.....	Covert, Box 44.
Decatur.....	J. Goble.....	Decatur.....		No.....	Robert H. Ballou.....	Decatur*.....
Geneva.....	Orin L. Cummins.....	South Haven*.....	5	Yes.....	Jonathan E. Goble.....	South Haven, R. D. 5.*
Hamilton.....	Floyd W. Osborn.....	Decatur*.....		No.....	O. L. Cummins.....	Decatur*.....
Harford.....	Grant L. Jones.....	Harford.....		No.....	Floyd W. Osborn.....	Harford.....
Keeler.....	C. P. Baggerly.....	Keeler*.....		No.....	Geo. S. McCortier.....	Keeler*.....
Lawrence.....	M. B. Cullom.....	Lawrence*.....		No.....	C. P. Baggerly.....	Lawrence*.....
Paw Paw.....	A. Dewitt Ferguson.....	Paw Paw*.....	6	Yes.....	Moses B. Cullom.....	Paw Paw*.....
Pine Grove.....	Lewis Weber.....	Kendall.....		No.....	A. Dewitt Ferguson.....	Kendall*.....
Porter.....	Owen J. Maxam.....	South Haven*.....		No.....	L. H. Weber.....	South Haven*.....
South Haven.....	Henry J. Dodge.....	South Haven*.....		No.....	Owen J. Maxam.....	South Haven*.....
Waverly.....	Archie Snell.....	Paw Paw, R. D. 3.....		No.....	Henry J. Dodge.....	Paw Paw, R. D. 3.*
				No.....	Archie T. Snell.....	
				Yes.....	Frank Hagen.....	Ann Arbor, R. D. 1.*
			1	Yes.....	Frederick Helzerman.....	Willis, R. D. 1.
			3	Yes.....	Henry P. Paul.....	Manchester, R. D.*
			2	Yes.....	Frank Nixon.....	Dexter, R. D. 1.
				No.....	Daniel Strieter.....	Chelsea, R. D. 2.*
			1	Yes.....	John Lucht.....	Dexter, R. D. 1.*
			4	Yes.....	John Lindemann.....	Ann Arbor, R. D. 2.
			1	Yes.....	Silas Young.....	Chelsea*.....
			1	No.....		

WASHINGTON COUNTY:

Ann Arbor.....	Frank Hagen.....	Ann Arbor, R. D. 1.....		Yes.....	Frank Hagen.....	Ann Arbor, R. D. 1.*
Augusta.....	Thomas D. Gots.....	Willis*.....	1	Yes.....	Frederick Helzerman.....	Willis, R. D. 1.
Bridgewater.....	Henry P. Paul.....	Manchester*.....	3	Yes.....	Henry P. Paul.....	Manchester, R. D.*
Dexter.....	Robert McNeil.....	Dexter.....	2	Yes.....	Frank Nixon.....	Dexter, R. D. 1.
Freedom.....	Don Strieter.....	Chelsea, R. D. 2.....	1	No.....	Daniel Strieter.....	Chelsea, R. D. 2.*
Lima.....	John Lucht.....	Dexter, R. D. 1*.....		Yes.....	John Lucht.....	Dexter, R. D. 1.*
Lodi.....	Christian Furthmiller.....	Ann Arbor, R. D. 4.....	4	Yes.....	John Lindemann.....	Ann Arbor, R. D. 2.
Lyndon.....	Silas Young.....	Chelsea, R. D. 3*.....	1	Yes.....	Silas Young.....	Chelsea*.....

STATE HIGHWAY DEPARTMENT

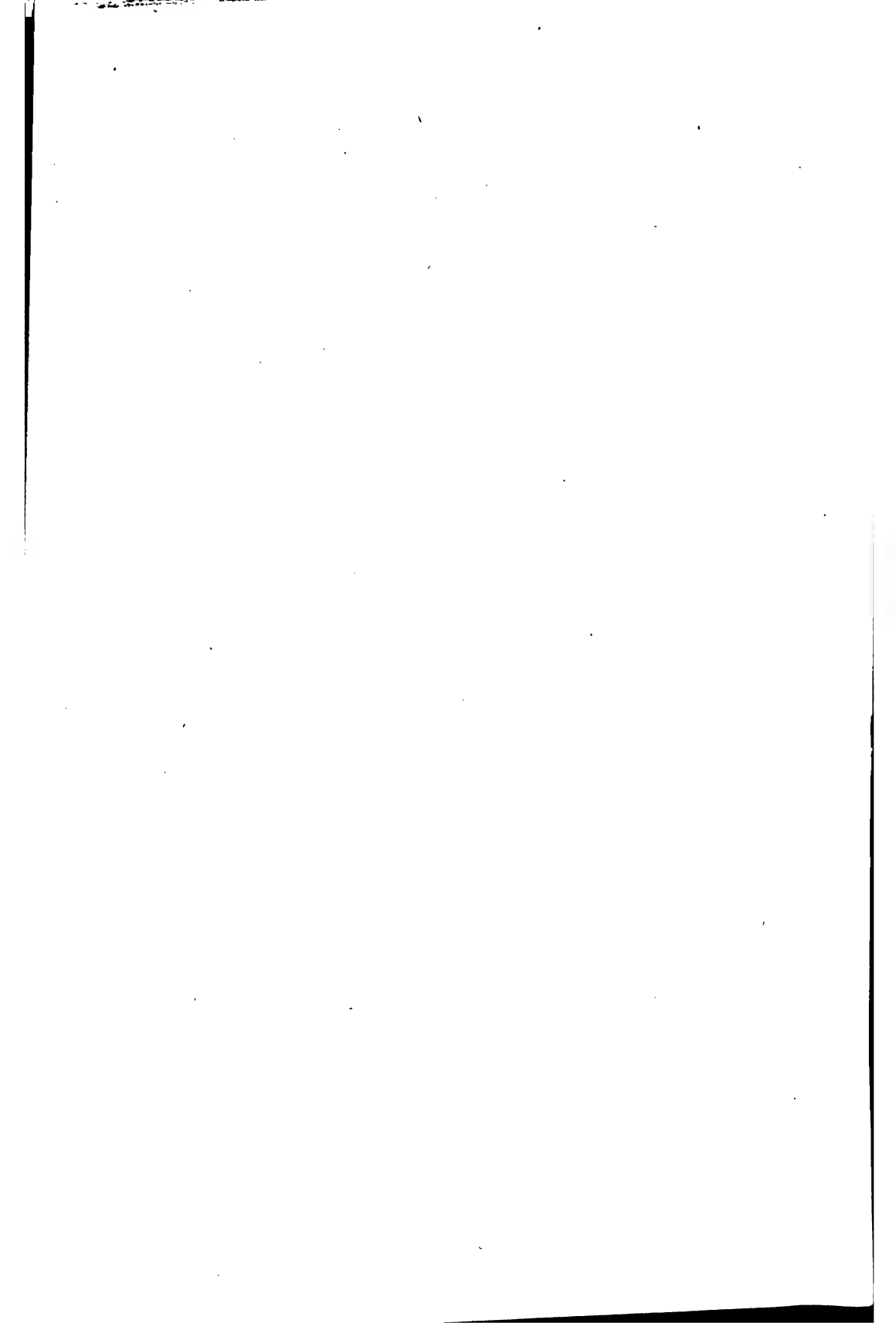
County and Township.	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner.	Post Office Address.
WASHTENAW Co.—Con.						
Manchester.	Albert D. English.	Manchester, R. D. 4.		No.	Adam J. Wurster.	Manchester.
Northfield.	Geo. Rauschenberger.	Whitmore Lake, R. D. 1.*		No.	Geo. Rauschenberger.	Whitmore Lake, R. D. 1.*
Pittsfield.	Amos Lohr.	Ann Arbor, R. D. 6*.	2	No.	Amos E. Lohr.	Ann Arbor.*
Salem.	Morgan Roberts.	Salem.		No.	Morgan Roberts.	Salem.*
Saline.	Wilbur D. Cortish.	Saline.		No.	Wilbur D. Cornish.	Saline.*
Scio.	John Egeler.	Dexter.		No.	John Egeler.	Dexter.*
Sharon.	John Uphaus.	Manchester.*		No.	Ernest Raymond.	Manchester, R. D.
Superior.	James Hanby.	Ann Arbor, R. D. 8*.	2	Yes.	Frank C. King.	Ypsilanti, R. D.
Sylvan.	Joseph Liebeck.	Chelsea.*	2	Yes.	Alfred Gilbert.	Chelsea.
Webster.	John Schultz.	Dexter, R. D. 3*.	3	Yes.	John W. Schultz.	Dexter, R. D. 3.*
York.	Chas. R. Colby.	Saline, R. D. 5*.	3	Yes.	R. Jay Bird.	Milan.
Ypsilanti.	Richard E. Gorton.	Ypsilanti, R. D. 1*.		No.	Richard E. Gorton.	Ypsilanti, R. D. 1.*
WAYNE COUNTY:						
Brownstown.	Geo. Springsted.	Rockwood*.	2	Yes.	C. L. Metter.	Flat Rock.
Canton.	George White.	Plymouth, R. D. 2.*	2	Yes.	Edward Barker.	Canton.
Dearborn.	Charles Forsyth.	Dearborn.	2	Yes.	John Wiethof.	Inkster.
Ecorse.	Thomas LeBlanc.	River Rouge, R. D. 1.	1	Yes.	Thomas LeBlanc.	River Rouge, R. D. 1.*
Gratiot.	Henry Carrey.	North Detroit.	1	Yes.	Henry Carrey.	North Detroit, R. D. 2.*
Greenfield.	Benjamin Kortie.	Greenfield, R. D. 1*.	2	Yes.	Henry Grix.	Highland Park.
Grosse Pointe.	Noah G. Paye.	Grosse Pointe Farms.	1	Yes.	Noah G. Paye.	Grosse Pointe Farms.*
Hamtramck.	Charles Yonka.	North Detroit.	1	Yes.	Charles Yonka, Jr.	North Detroit.*
Huron.	George Foel.	New Boston, R. D. 7*.	2	Yes.	Clarence L. Stoffel.	New Boston.
Livonia.	William Johnson.	Stark*.		No.	Wm. Johnson.	Stark.*
Monguegon.	Alexander Groh.	Grosse Isle*.	3	Yes.	Alexander Groh.	Grosse Isle.*
Nankin.	Wm. Sherwood.	Inkster, R. D. 2.	1	Yes.	Charles Tyley.	Inkster, R. D. 1.
Northville.	Harley D. Johnson.	Northville*.	3	Yes.	Jesse Clark.	Northville.
Plymouth.	Theodore F. Chilson.	Plymouth*.	5	Yes.	Burton D. Brown.	Plymouth.
Redford.	Jesse L. Mack.	Redford*.	3	Yes.	Jesse L. Mack.	Redford.*
Romulus.	Patrick McConlogue.	Inkster.	2	Yes.	Patrick McConlogue.	Inkster.*
Springwells.	Chas. Krueger.	Dearborn, R. D. 4.	1	Yes.	Chas. A. Krueger.	Dearborn, R. D. 4.*
Sumpter.	Joseph Bird.	Willis.		No.	Joseph H. Bird.	Willis.*
Taylor.	Charles Stevenson.	Hand Station.	1	No.	Charles Stevenson.	Hand Station.*
Van Buren.	William Day.	Belleville.	1	No.	James C. Pullen.	Belleville.
WEXFORD COUNTY:						
Antioch.	Fred Usewick.	Mesick*.		No.	Jno. Sayer.	Mesick, R. D. 1, Box 83.
Boon.	Edgar Stanciff.	Boon*.	3	Yes.	William S. Marshall.	Boon.
Cedar Creek.	Nels E. Hedquist.	Gilbert*.	2	Yes.	Nels E. Hedquist.	Gilbert.*
Cherry Grove.	Elias Morken.	Axin.		Yes.	Peter Siglin.	Benson.
Clam Lake.	Bart Lemon.	Cadillac, R. D. 1.	1	Yes.	Charles A. Olson.	Cadillac, R. D. 1.
Colfax.	Ira Jenkins.	Meauwata.	5	Yes.	E. A. Saunders.	Manton.

Greenwood.....	H. J. Scott.....	Manton.....	1	Yes.	E. E. Ginter.....	Haire.....
Hanover.....	Wm. J. Dougherty.....	Buckley*.....	1	No.	Wm. J. Dougherty.....	Buckley*.....
Harrington.....	J. A. Magnuson.....	Cadillac, R. D. 2*.....	2	Yes.	Wm. W. Loveless.....	Cadillac, R. D. 2.
Henderson.....	Oscar Russell.....	Angola*.....	2	Yes.	Oscar Russell.....	Angola*.....
Liberty.....	Frank Alderman.....	Manton, R. D. 1*.....	2	Yes.	Frank Alderman.....	Manton, R. D. 1*
Selma.....	John T. Parker.....	Boon, R. D. 1.....	10	Yes.	Marion B. Boyd.....	Cadillac, R. D. 2.
Slagle.....	Calvin Wright.....	Harrietta, Box 88.....	3	Yes.	Silas C. Bliss.....	Harrietta.....
South Branch.....	John Henderson.....	Harrietta.....	3	Yes.	D. C. Scarbrough.....	Hoxeyville.....
Springville.....	James Bentley.....	Mesick, Box 37.....	1	Yes.	Wm. Neddo.....	Mesick.....
Wexford.....	Walter L. Sturtevant.....	Sherman.....	1	Yes.	Henry Hill.....	Sherman, R. D.

* Re-elected.

† Election contested.

LIST OF ILLUSTRATIONS.



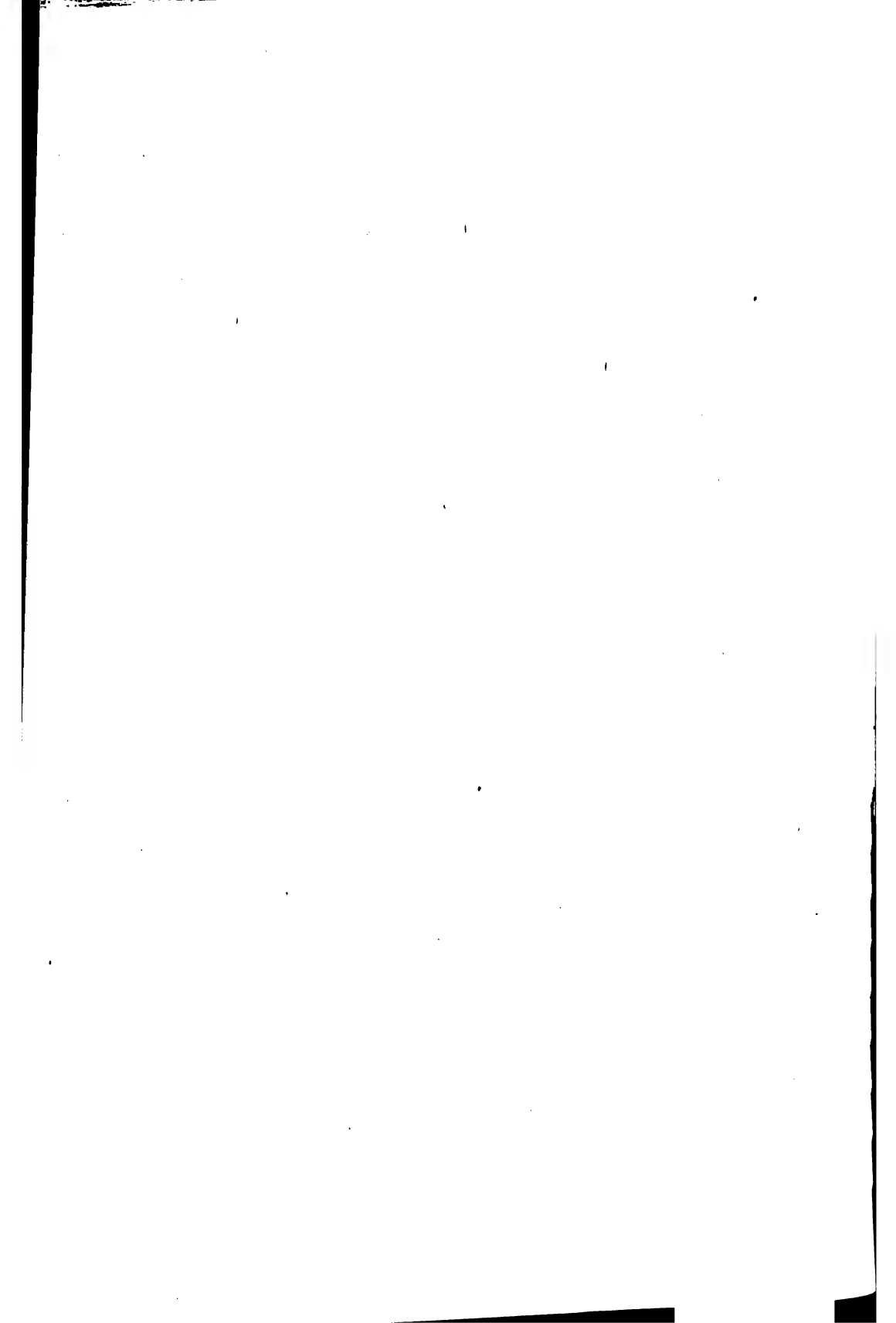
INDEX OF ILLUSTRATIONS.

	Page
Antrim county.....	78
Arcada township.....	68
Bad road.....	145
Barry county.....	126
Bay county.....	108
Benzie county.....	36
Berrien county.....	132, 142
Bog road.....	267
Branch county.....	170, 180, 284
Bridge gravel loader.....	246, 248
Bridges.....	58, 196, 206, 284, 312
double span.....	200
single span, deck.....	205
I-beam.....	209
plate girder.....	204
riveted truss.....	202
Butler township.....	284
Calhoun county.....	126, 128
Cheboygan county.....	296
Chesaning township.....	189
Coldwater township.....	170, 180
Commissioner, Earle.....	4
Convict labor.....	302
County roads.....	7, 14, 30, 46, 88, 98, 108, 118, 152, 160, 194, 224, 234, 274, 296, 318, 326, 352, 360, 376
Culverts.....	212, 214
flat top.....	221
forms.....	220
round.....	217
square.....	219
Dickinson county.....	30, 46, 384
Douglass township.....	128
Drags.....	262, 263
Earle, Horatio S.....	4
Eaton township.....	232
Emmet township.....	126, 128
Engine, grading.....	232
Ever-ready road drag.....	263
Exeter township.....	126, 128
Fort road.....	194
Good road.....	145
Grading.....	232, 352
Grand Rapids township.....	274
Grand River road.....	152
Grant rut-out.....	262
Gratiot county.....	68
Gratiot road.....	326, 360
Gravel loader.....	246, 248, 252
road plans.....	29, 250
roads.....	36, 68, 78, 126, 128, 132, 170, 180, 274
screens.....	252, 254, 256
Hart township.....	296
Henrietta township.....	78, 312
Homestead township.....	36
Ingham county.....	334
Ionia county.....	232
Jackson county.....	78, 312
Jonesfield township.....	318

INDEX OF ILLUSTRATIONS.

	Page
Alaska county.....	118, 224, 352
road crew.....	118, 342, 348
Ant county.....	274
Ansing township.....	334
ader, gravel.....	246, 248, 252
Acadam road.....	7, 30, 46, 88, 98, 108, 118, 132, 142, 152, 160, 189, 194, 234, 296, 318, 326, 352, 360, 384
plans.....	35
ancelona township.....	78
Arquette county.....	6, 30, 46, 302, 384
son county.....	274
antha roads.....	132, 246, 248
chigan avenue road.....	88, 368, 376
onroe county.....	58, 312
ontcalm county.....	128
Elliott road.....	160, 234
iskegon county.....	98
eana county.....	296
ne Grove township.....	132, 246, 248
ne River township.....	68
ans, gravel road.....	29, 250
macadam road.....	35
esque Isle county.....	14
ofile, detailed.....	20
standard.....	21
arrying trap rock.....	302
ads, bad and good.....	145
iller, concrete.....	231
snow.....	264
it-out.....	262
itland township.....	126
ginaw county.....	189, 318
reening device.....	252, 254, 256
lney township.....	128
ow roller.....	264
Joseph township.....	132, 142
stitute labor convention.....	183
eam engine, grading.....	232
bscription roads.....	126, 128, 132
amp road.....	267
r-veneer macadam roads.....	152, 160, 194, 234, 326, 360
ap rock roads.....	6, 30, 46, 384
n Buren county.....	132, 246, 248
ayne county.....	14, 88, 152, 160, 194, 234, 236, 360, 368, 376

INDEX.



INDEX.

	Page
"A" road, specifications for.....	26
Abutments, specifications.....	212
Aid, national for roads.....	284, 288, 289
Aid, other states.....	129, 130, 270, 271, 273
Application for state reward.....	20
list of.....	37, 58
Appropriation.....	125
Arch culverts.....	210
Assessed valuation.....	319, 357
Attorney general, opinions.....	129, 192, 229, 230
Automobile roads.....	258
tax.....	258
tires.....	257
Automobiles.....	258
Automobilist good road petition.....	162
Average cost state reward roads.....	124
 "B" road, plans for.....	29, 250
specifications for.....	27
Better roads for Michigan.....	151
Bids.....	24
Board of supervisors, powers and duties.....	190
Bog swamp.....	266
Bonding for building roads.....	174
Bonding law, county.....	171
township.....	172
Brazil—state reward.....	273
Bridge floors.....	207, 210
law, intertown.....	193
maintenance.....	256
specifications.....	201
Bridges and culverts.....	196
cost of.....	197
Bridges, double span.....	200
single span, deck.....	205
single span, I-beam.....	209
single span, plate girder.....	204
single span, riveted truss.....	202
 "C" road, specifications for.....	30
Cash road tax law.....	175
letters relative to.....	184, 188
Clay-gravel road specifications.....	26
Clay-sand roads.....	253, 256
Commissioners, county road.....	355
county road, reports of.....	158
township highway.....	358
township highway, suggestions by.....	275
Concrete abutments.....	212
arch culverts.....	210
floors for bridges.....	207
road roller.....	231
tile.....	214
Contracts.....	25, 192
Convict labor.....	297
Costs of roads.....	59, 124
County road commissioners.....	355
reports of.....	158
County road law.....	132
philosophy.....	145
system data.....	154
system, opinions of editors.....	155
County tax and bonding law.....	171
Creosote wood block bridge floors.....	210
Culvert maintenance.....	256
Culverts.....	223

	Page
culverts, concrete.....	210, 221, 222
cost of, average.....	224
cost of 1907.....	197
forms.....	220, 222
round.....	216
square box.....	216
cuts and fills.....	268
D" road, specifications for.....	32
damage by automobiles.....	258
data, county road system.....	154
digest, cash tax law.....	180
county road law.....	144
fitting, legal opinion.....	230
fogs.....	260, 262, 263
rainage.....	225, 226, 228
rainage, opinion of attorney general.....	229
rivers, legal opinions.....	229, 230
riding in center of road.....	256
E" road, plans for.....	35
specifications for.....	34
asphalt gravel screening device.....	255
editorials on convict labor.....	307
editors on county road system, opinions of.....	155
employees.....	3, 125
encroachments.....	191
engines on highways.....	232, 233
expense of building state reward roads.....	59, 124
expenses of department.....	125
expense viewers.....	183
fills and cuts.....	268
looks for bridges.....	207, 210
form for culvert, collapsible.....	220, 222
ood roads.....	145, 150, 151
petition.....	152
grade of highway.....	181
grading, legal opinion.....	230
grading with engines.....	233
gravel for roads.....	238, 247
gravel, number cubic yards per mile.....	246
gravel road building in winter.....	251
maintenance.....	256
plans.....	29, 250
specifications.....	27
gravel-stone road specifications.....	32
gravity loading and screening device.....	253
highway commissioners.....	313
letters.....	184, 188
suggestions by.....	275
highway taxes 1908.....	319
beams, table of sizes and weights.....	208
linols, convict labor.....	297
improving township roads.....	189
labor, convict.....	297
law, cash road tax.....	175
contracts.....	192
county road.....	132
county tax and bonding.....	171
drainage.....	228
intertown road and bridge.....	193
state reward.....	14
steam engines.....	232
township bonding.....	172
legal opinions by attorney general.....	129, 192, 229, 230
letter of transmittal.....	5
letters, highway commissioners.....	184, 188
letters to governor.....	5, 11
loading and screening gravel.....	253
macadam road, maintenance.....	255
plans.....	35
specifications.....	34
machinery, road district.....	182
maintenance, road and bridge.....	255
material for roads.....	238
members of department.....	3
penha roads.....	129
files state reward road.....	58
Missouri convict labor.....	303
motor vehicle fund.....	125, 152

	Page
National aid for roads.....	284, 289, 293
National reward road bill.....	285
New York state aid.....	270
Old state roads.....	268
Opinions by attorney general.....	129, 192, 229, 230
of editors, convict labor.....	314, 315
Pavements, tar-macadam.....	236
Pennsylvania state aid.....	271
Petition, automobile.....	152
for good roads.....	152
Plans, gravel road.....	29, 250
macadam.....	35
Poles.....	191
Profile, detailed.....	20
standard.....	21
Recommendations and report.....	7
Report and recommendations.....	7
Reports, county road commissioners.....	158
Resolutions.....	293, 313
Reward, national.....	284, 288, 289
Reward paid.....	58
road law.....	14
Reward, state, list of applications for.....	37
Reward roads, cost of.....	59, 124
miles.....	58
Road and bridge law, intertown.....	193
Road district machinery.....	182
kinks.....	275
material.....	238
Roads, old state.....	268
settlers.....	268
swamp.....	265, 266
Roller, concrete road.....	231
snow.....	265
Salaries.....	125
Sand-clay roads.....	253, 256
Screening devices.....	253, 254
Settlers roads.....	268
Shade trees.....	269
Snow-roller.....	265
Sodding cuts and fills.....	268
Specifications, bridges.....	201
class "A" road.....	26
class "B" road.....	27
class "C" road.....	30
class "D" road.....	32
class "E" road.....	34
clay-gravel road.....	26
concrete abutments.....	212
general.....	22
gravel.....	27
gravel-stone.....	32
macadam.....	34
state.....	26
stone-gravel.....	30
tar-macadam pavement.....	236
tar-veneer macadam road.....	234
Stanton gravel road.....	128
State aid in other states.....	129, 130, 270, 271, 273
State reward, how to apply for.....	20
list of applications.....	37
road law.....	14
State reward roads, cost of.....	59, 124
Statistics, convict labor.....	314, 315
State roads, old.....	268
Statute labor.....	183, 189
Steam engines, law.....	232
Stone for roads.....	238
Stone-gravel road, specifications for.....	30
Stone, number cubic yards per mile.....	246
tests.....	329
Sub-grade and drainage.....	226
Subscription roads.....	127, 128
Suggestions by township highway commissioners.....	275
Supervisors, board of, powers and duties.....	190
Supreme court decision.....	230
Surveyor, grade of highway.....	181
Swamp roads.....	265, 266
Synopsis of cash tax law.....	180
of county road law.....	144
state reward roads.....	11

LIST OF ILLUSTRATIONS.

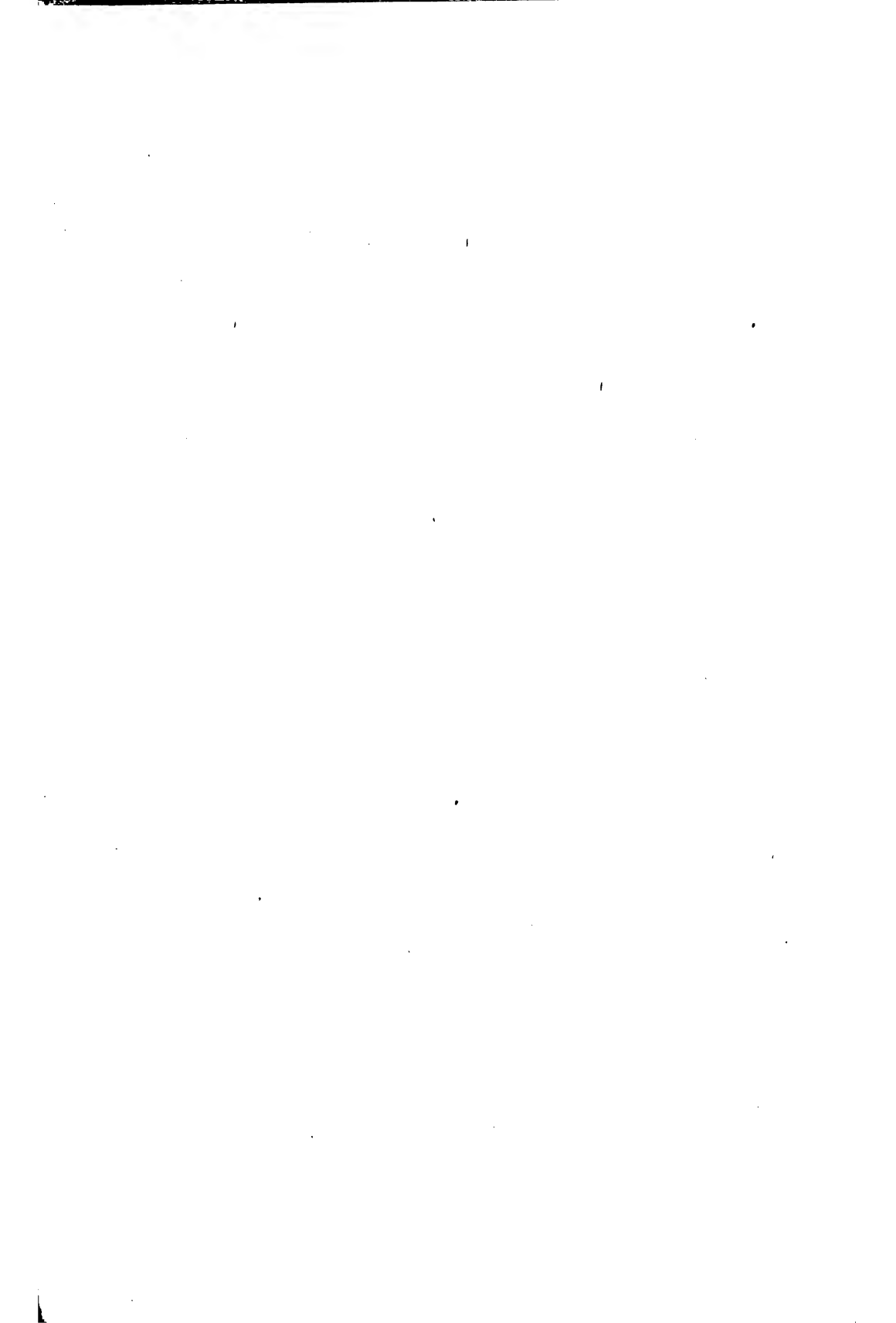


INDEX OF ILLUSTRATIONS.

	Page
Antrim county.....	78
Arcada township.....	68
Bad road.....	145
Barry county.....	126
Bay county.....	108
Benzie county.....	36
Berrien county.....	132, 142
Bog road.....	267
Branch county.....	170, 180, 284
Bridge gravel loader.....	246, 248
Bridges.....	58, 196, 206, 284, 312
double span.....	200
single span, deck.....	205
I-beam.....	209
plate girder.....	204
riveted truss.....	202
Butler township.....	284
Calhoun county.....	126, 128
Cheboygan county.....	296
Chesaning township.....	189
Coldwater township.....	170, 180
Commissioner, Earle.....	4
Convict labor.....	302
County roads.....	7, 14, 30, 46, 88, 98, 108, 118, 152, 160, 194, 224, 234, 274, 296, 318, 326, 352, 360, 376
Culverts.....	212, 214
flat top.....	221
forms.....	220
round.....	217
square.....	219
Dickinson county.....	30, 46, 384
Douglass township.....	128
Drags.....	262, 263
Earle, Horatio S.....	4
Eaton township.....	232
Emmet township.....	126, 128
Engine, grading.....	232
Ever-ready road drag.....	263
Exeter township.....	126, 128
Fort road.....	194
Good road.....	145
Grading.....	232, 352
Grand Rapids township.....	274
Grand River road.....	152
Grant rut-out.....	262
Gratiot county.....	68
Gratiot road.....	326, 360
Gravel loader.....	246, 248, 252
road plans.....	29, 250
roads.....	36, 68, 78, 126, 128, 132, 170, 180, 274
screens.....	252, 254, 256
Hart township.....	296
Henrietta township.....	78, 312
Homestead township.....	36
Ingham county.....	334
Ionia county.....	232
Jackson county.....	78, 312
Jonesfield township.....	318

	Page
Kalkaska county.....	118, 224, 352
road crew.....	118, 342, 348
Kent county.....	274
Lansing township.....	334
Loader, gravel.....	246, 248, 252
Macadam road.....	7, 30, 46, 88, 98, 108, 118, 132, 142, 152, 160, 189, 194, 234, 296, 318, 326, 352, 360, 384
plans.....	35
Mancelona township.....	78
Marquette county.....	6, 30, 46, 302, 384
Mason county.....	274
Menthia roads.....	132, 246, 248
Michigan avenue road.....	88, 368, 376
Monroe county.....	58, 312
Montcalm county.....	128
Mt. Elliott road.....	160, 234
Muskegon county.....	98
Oceana county.....	296
Pine Grove township.....	132, 246, 248
Pine River township.....	68
Plans, gravel road.....	29, 250
macadam road.....	35
Presque Isle county.....	14
Profile, detailed.....	20
standard.....	21
Quarrying trap rock.....	302
Roads, bad and good.....	145
Roller, concrete.....	231
snow.....	264
Rut-out.....	262
Rutland township.....	126
Saginaw county.....	189, 318
Screening device.....	252, 254, 256
Sidney township.....	128
Snow roller.....	264
St. Joseph township.....	132, 142
Statute labor convention.....	183
Steam engine, grading.....	232
Subscription roads.....	126, 128, 132
Swamp road.....	267
Tar-veneer macadam roads.....	152, 160, 194, 234, 326, 360
Trap rock roads.....	6, 30, 46, 384
Van Buren county.....	132, 246, 248
Wayne county.....	14, 88, 152, 160, 194, 234, 236, 360, 368, 376

INDEX.



INDEX.

	Page
"A" road, specifications for.....	26
Abutments, specifications.....	212
Aid, national for roads.....	284, 288, 289
Aid, other states.....	129, 130, 270, 271, 273
Application for state reward.....	20
list of.....	37, 58
Appropriation.....	125
Arch culverts.....	210
Assessed valuation.....	319, 357
Attorney general, opinions.....	129, 192, 229, 230
Automobile roads.....	258
tax.....	258
tires.....	257
Automobiles.....	258
Automobilist good road petition.....	152
Average cost state reward roads.....	124
"B" road, plans for.....	29, 250
specifications for.....	27
Better roads for Michigan.....	151
Bids.....	24
Board of supervisors, powers and duties.....	190
Bog swamp.....	268
Bonding for building roads.....	174
Bonding law, county.....	171
township.....	172
Brazil—state reward.....	273
Bridge floors.....	207, 210
law, intertown.....	193
maintenance.....	258
specifications.....	201
Bridges and culverts.....	198
cost of.....	197
Bridges, double span.....	200
single span, deck.....	205
single span, I-beam.....	209
single span, plate girder.....	204
single span, riveted truss.....	202
"C" road, specifications for.....	30
Cash road tax law.....	175
letters relative to.....	184, 188
Clay-gravel road specifications.....	26
Clay-sand roads.....	253, 256
Commissioners, county road.....	355
county road, reports of.....	158
township highway.....	358
township highway, suggestions by.....	275
Concrete abutments.....	212
arch culverts.....	210
floors for bridges.....	207
road roller.....	231
tile.....	214
Contracts.....	25, 192
Convict labor.....	297
Costs of roads.....	59, 124
County road commissioners.....	355
reports of.....	158
County road law.....	132
philosophy.....	145
system data.....	154
system, opinions of editors.....	155
County tax and bonding law.....	171
Creosote wood block bridge floors.....	210
Culvert maintenance.....	256
Culverts.....	223

	Page
Culverts, concrete.....	210, 221, 222
cost of, average.....	224
cost of 1907.....	197
forms.....	220, 222
round.....	216
square box.....	216
Cuts and fills.....	268
“D” road, specifications for.....	32
Damage by automobiles.....	258
Data, county road system.....	154
Digest, cash tax law.....	180
county road law.....	144
Ditching, legal opinion.....	230
Drags.....	260, 262, 263
Drainage.....	225, 226, 228
Drainage, opinion of attorney general.....	229
Driveways, legal opinions.....	229, 230
Driving in center of road.....	256
“E” road, plans for.....	35
specifications for.....	34
Easel gravel screening device.....	255
Editorials on convict labor.....	307
Editors on county road system, opinions of.....	155
Employees.....	3, 125
Encroachments.....	191
Engines on highways.....	232, 233
Expense of building state reward roads.....	59, 124
Expenses of department.....	125
Fence viewers.....	183
Fills and cuts.....	268
Floors for bridges.....	207, 210
Form for culvert, collapsible.....	220, 222
Good roads.....	145, 150, 151
petition.....	152
Grade of highway.....	181
Grading, legal opinion.....	230
Grading with engines.....	233
Gravel for roads.....	238, 247
Gravel, number cubic yards per mile.....	246
Gravel road building in winter.....	251
maintenance.....	256
plans.....	29, 250
specifications.....	27
Gravel-stone road specifications.....	32
Gravity loading and screening device.....	253
Highway commissioners.....	313
letters.....	184, 188
suggestions by.....	275
Highway taxes 1908.....	319
I-beams, table of sizes and weights.....	208
Illinois, convict labor.....	297
Improving township roads.....	189
Labor, convict.....	297
Law, cash road tax.....	175
contracts.....	192
county road.....	132
county tax and bonding.....	171
drainage.....	228
intertown road and bridge.....	193
state reward.....	14
steam engines.....	232
township bonding.....	172
Legal opinions by attorney general.....	129, 192, 229, 230
Letter of transmittal.....	5
Letters, highway commissioners.....	184, 188
Letters to governor.....	5, 11
Loading and screening gravel.....	253
Macadam road, maintenance.....	255
plans.....	35
specifications.....	34
Machinery, road district.....	182
Maintenance, road and bridge.....	255
Material for roads.....	238
Members of department.....	3
Mentha roads.....	129
Miles state reward road.....	58
Missouri convict labor.....	303
Motor vehicle fund.....	125, 152

	Page
National aid for roads.....	284, 289, 293
National reward road bill.....	285
New York state aid.....	270
Old state roads.....	268
Opinions by attorney general.....	129, 192, 229, 230
of editors, convict labor.....	314, 315
Pavements, tar-macadam.....	236
Pennsylvania state aid.....	271
Petition, automobile.....	152
for good roads.....	152
Plans, gravel road.....	29, 250
macadam.....	35
Poles.....	191
Profile, detailed.....	20
standard.....	21
Recommendations and report.....	7
Report and recommendations.....	7
Reports, county road commissioners.....	158
Resolutions.....	293, 313
Reward, national.....	284, 288, 289
Reward paid.....	58
road law.....	14
Reward, state, list of applications for.....	37
Reward roads, cost of.....	59, 124
miles.....	58
Road and bridge law, intertown.....	193
Road district machinery.....	182
kinks.....	275
material.....	238
Roads, old state.....	268
settlers.....	268
swamp.....	265, 266
Roller, concrete road.....	231
snow.....	265
Salaries.....	125
Sand-clay roads.....	253, 256
Screening devices.....	253, 254
Settlers roads.....	268
Shade trees.....	269
Snow-roller.....	265
Sodding cuts and fills.....	268
Specifications, bridges.....	201
class "A" road.....	26
class "B" road.....	27
class "C" road.....	30
class "D" road.....	32
class "E" road.....	34
clay-gravel road.....	26
concrete abutments.....	212
general.....	22
gravel.....	27
gravel-stone.....	32
macadam.....	34
state.....	26
stone-gravel.....	30
tar-macadam pavement.....	236
tar-veneer macadam road.....	234
Stanton gravel road.....	128
State aid in other states.....	129, 130, 270, 271, 273
State reward, how to apply for.....	20
list of applications.....	37
road law.....	14
State reward roads, cost of.....	59, 124
Statistics, convict labor.....	314, 315
State roads, old.....	268
Statute labor.....	183, 189
Steam engines, law.....	232
Stone for roads.....	238
Stone-gravel road, specifications for.....	30
Stone, number cubic yards per mile.....	246
tests.....	329
Sub-grade and drainage.....	226
Subscription roads.....	127, 128
Suggestions by township highway commissioners.....	275
Supervisors, board of, powers and duties.....	190
Supreme court decision.....	230
Surveyor, grade of highway.....	181
Swamp roads.....	265, 266
Synopsis of cash tax law.....	180
of county road law.....	144
state reward roads.....	11

STATE HIGHWAY DEPARTMENT

TOWNSHIP HIGHWAY COMMISSIONERS.—Concluded.

County and Township.	1907				1908	
	Highway Commissioner.	Post Office Address.	Years served.	Attended road institute.	Highway Commissioner.	Post Office Address.
WASHTENAW Co. :—Con.						
Manchester.....	Albert D. English.....	Manchester, R. D. 4.....		No.....	Adam J. Wurster.....	Manchester.....
Northfield.....	Geo. Rauschenberger.....	Whitmore Lake, R. D. 1*.....		No.....	Geo. Rauschenberger.....	Whitmore Lake, R. D. 1*.....
Pittsfield.....	Amos Lohr.....	Ann Arbor, R. D. 6*.....	2	No.....	Amos E. Lohr.....	Ann Arbor*.....
Salem.....	Morgan Roberts.....	Salem.....		No.....	Morgan Roberts.....	Salem*.....
Saline.....	Wilbur D. Cornish.....	Saline.....		No.....	Wilbur D. Cornish.....	Saline*.....
Scio.....	John Egeler.....	Dexter.....		No.....	John Egeler.....	Dexter*.....
Sharon.....	John Uphaus.....	Manchester*.....		No.....	Ernest Raymond.....	Manchester, R. D.....
Superior.....	James Hanly.....	Ann Arbor, R. D. 8*.....	2	Yes.....	Frank C. King.....	Ypsilanti, R. D.....
Sylvan.....	Joseph Liebeck.....	Chelsea*.....	2	Yes.....	Alfred Gilbert.....	Chelsea.....
Webster.....	John Schultz.....	Dexter, R. D. 3*.....	3	Yes.....	John W. Schultz.....	Dexter, R. D. 3*.....
York.....	Chas. R. Cobb.....	Saline, R. D. 5*.....	3	Yes.....	R. Jay Bird.....	Milan.....
Ypsilanti.....	Richard E. Gorton.....	Ypsilanti, R. D. 1*.....		No.....	Richard E. Gorton.....	Ypsilanti, R. D. 1*.....
WAYNE COUNTY:						
Brownstown.....	Geo. Springstead.....	Rockwood*.....	2	Yes.....	C. L. Metter.....	Flat Rock.....
Canton.....	George White.....	Plymouth, R. D. 2*.....	2	Yes.....	Edward Barker.....	Canton.....
Dearborn.....	Charles Fonthill.....	Dearborn.....	2	Yes.....	John Wethol.....	Inkster.....
Ecorse.....	Thomas LeBlanc.....	River Rouge, R. D. 1.....	1	Yes.....	Thomas LeBlanc.....	River Rouge, R. D. 1*.....
Gratiot.....	Henry Carreyu.....	North Detroit.....	1	Yes.....	Henry Carreyu.....	North Detroit: R. D. 2*.....
Greenfield.....	Benjamin Kortie.....	Greenfield, R. D. 1*.....	2	Yes.....	Henry Grix.....	Highland Park.....
Grosse Pointe.....	Noah G. Paye.....	Grosse Pointe Farms.....	1	Yes.....	Noah G. Paye.....	Grosse Pointe Farms*.....
Hamtramck.....	Charles Yonka.....	North Detroit.....	1	Yes.....	Charles Yonka, Jr.....	North Detroit*.....
Huron.....	George Poet.....	New Boston, R. D. 7*.....	2	Yes.....	Clarence L. Stoffel.....	New Boston.....
Livonia.....	William Johnson.....	Stark*.....		No.....	Wm. Johnson.....	Stark*.....
Monguagon.....	Alexander Groh.....	Grosse Isle*.....	3	Yes.....	Alexander Groh.....	Grosse Isle*.....
Nankin.....	Wm. Sherwood.....	Inkster, R. D. 2.....	1	Yes.....	Charles Tyley.....	Inkster, R. D. 1.....
Northville.....	Harley D. Johnson.....	Northville*.....	3	Yes.....	Jesse Clark.....	Northville.....
Plymouth.....	Theodore F. Chilson.....	Plymouth*.....	5	Yes.....	Hurton D. Brown.....	Plymouth.....
Redford.....	Jesse L. Mack.....	Redford*.....	3	Yes.....	Jesse L. Mack.....	Redford*.....
Romulus.....	Patrick McConlogue.....	Inkster*.....	2	Yes.....	Patrick McConlogue.....	Inkster*.....
Springwells.....	Chas. Krueger.....	Dearborn, R. D. 4.....	1	Yes.....	Chas. A. Krueger.....	Dearborn, R. D. 4*.....
Sumpter.....	Joseph Bird.....	Willis.....		No.....	Joseph H. Bird.....	Willis*.....
Taylor.....	Charles Stevenson.....	Hand Station.....	1	No.....	Charles Stevenson.....	Hand Station*.....
Van Buren.....	William Day.....	Belleville.....	1	No.....	James C. Pullen.....	Belleville.....
WEXFORD COUNTY:						
Antioch.....	Fred Usewick.....	Mesick*.....		No.....	Jno. Sayer.....	Mesick, R. D. 1, Box 83.....
Boon.....	Edgar Stanchiff.....	Boon*.....	3	Yes.....	William S. Marshall.....	Boon.....
Cedar Creek.....	Nels E. Hedquist.....	Gilbert*.....	2	Yes.....	Nels E. Hedquist.....	Gilbert*.....
Cherry Grove.....	Elias Morken.....	Axin.....		Yes.....	Peter Siglin.....	Benson.....
Clam Lake.....	Bart Lemon.....	Cadillac, R. D. 1.....	1	Yes.....	Charles A. Olson.....	Cadillac, R. D. 1.....
Colfax.....	Ira Jenkins.....	Meauwataka.....	5	Yes.....	E. A. Saunders.....	Manton.....

Greenwood.....	H. J. Scott.....	Manton.....	1	Yes.....	E. E. Ginter.....	Haile.....
Hanover.....	Wm. J. Dougherty.....	Buckley*.....		No.....	Wm. J. Dougherty.....	Buckley *.....
Harring.....	J. A. Magnuson.....	Cadillac, R. D. 2*.....	2	Yes.....	Wm. W. Loveless.....	Cadillac, R. D. 2.....
Henderson.....	Oscar Russell.....	Angola*.....	2	Yes.....	Oscar Russell.....	Angola *.....
Liberty.....	Frank Alderman.....	Manton, R. D. 1*.....	10	Yes.....	Frank Alderman.....	Manton, R. D. 1.*.....
Selma.....	John T. Parker.....	Beon, R. D. 1.....	3	Yes.....	Marion H. Boyd.....	Cadillac, R. D. 2.....
Shagle.....	Calvin Wright.....	Harrietta, Box 88.....		Yes.....	Silas C. Bliss.....	Harrietta.....
South Branch.....	John Henderson.....	Harrietta.....		Yes.....	D. C. Scarbrough.....	Hoxeyville.....
Springville.....	James Henley.....	Mesick, Box 37.....		Yes.....	Wm. Scott.....	Mesick.....
Wexford.....	Walter L. Sturtevant.....	Sherman.....	1	Yes.....	Henry Hill.....	Sherman, R. D.

*Re-elected

†Election contested.

LIST OF ILLUSTRATIONS.

	Page
Table, convict labor.....	315
cubic yards stone and gravel.....	246
sizes and weights of I-beams.....	208
Tar-macadam pavements.....	236
Tar-veneer macadam roads.....	234
Tax, cash road law.....	175
letters relative to cash.....	184, 188
Tax on automobiles.....	258
Taxes, highway, 1908.....	319, 351
Testing stone.....	239, 243, 244
Tile.....	214
Tires.....	257
Todd, A. M. Co., roads built by.....	129
Township bonding law.....	172
Township highway commissioners.....	358
suggestions by.....	275
Traction engines.....	233
Trees.....	269
Valuation, assessed.....	319, 351
Washington, convict labor.....	305
Winter gravel road building.....	251

INDEX.

	Page
"A" road, specifications for.....	26
Abutments, specifications.....	212
Aid, national for roads.....	284, 288, 289
Aid, other states.....	129, 130, 270, 271, 273
Application for state reward.....	20
list of.....	37, 58
Appropriation.....	125
Arch culverts.....	210
Assessed valuation.....	319, 357
Attorney general, opinions.....	129, 192, 229, 230
Automobile roads.....	258
tax.....	258
tires.....	257
Automobiles.....	258
Automobilist good road petition.....	162
Average cost state reward roads.....	124
 "B" road, plans for.....	29, 250
specifications for.....	27
Better roads for Michigan.....	151
Bids.....	24
Board of supervisors, powers and duties.....	190
Bog swamp.....	266
Bonding for building roads.....	174
Bonding law, county.....	171
township.....	172
Brazil—state reward.....	273
Bridge floors.....	207, 210
law, intertown.....	193
maintenance.....	256
specifications.....	201
Bridges and culverts.....	196
cost of.....	197
Bridges, double span.....	200
single span, deck.....	205
single span, I-beam.....	209
single span, plate girder.....	204
single span, riveted truss.....	202
 "C" road, specifications for.....	30
Cash road tax law.....	175
letters relative to.....	184, 188
Clay-gravel road specifications.....	26
Clay-sand roads.....	253, 256
Commissioners, county road.....	355
county road, reports of.....	158
township highway.....	358
township highway, suggestions by.....	275
Concrete abutments.....	212
arch culverts.....	210
floors for bridges.....	207
road roller.....	231
tile.....	214
Contracts.....	25, 192
Convict labor.....	297
Costs of roads.....	59, 124
County road commissioners.....	355
reports of.....	158
County road law.....	132
philosophy.....	145
system data.....	154
system, opinions of editors.....	155
County tax and bonding law.....	171
Creosote wood block bridge floors.....	210
Culvert maintenance.....	256
Culverts.....	223

	Page
Culverts, concrete.....	210, 221, 222
cost of, average.....	224
cost of 1907.....	197
forms.....	220, 222
round.....	216
square box.....	216
Cuts and fills.....	268
"D" road, specifications for.....	32
Damage by automobiles.....	258
Data, county road system.....	154
Digest, cash tax law.....	180
county road law.....	144
Ditching, legal opinion.....	230
Drags.....	260, 262, 263
Drainage.....	225, 226, 228
Drainage, opinion of attorney general.....	229
Driveways, legal opinions.....	229, 230
Driving in center of road.....	256
"E" road, plans for.....	35
specifications for.....	34
Gravel screening device.....	255
Editorials on convict labor.....	307
Editors on county road system, opinions of.....	155
Employees.....	3, 125
Encroachments.....	191
Engines on highways.....	232, 233
Expense of building state reward roads.....	59, 124
Expenses of department.....	125
Fence viewers.....	183
Fills and cuts.....	268
Floors for bridges.....	207, 210
Form for culvert, collapsible.....	220, 222
Food roads.....	145, 150, 151
petition.....	152
Grade of highway.....	181
Grading, legal opinion.....	230
Grading with engines.....	233
Gravel for roads.....	238, 247
Gravel, number cubic yards per mile.....	246
Gravel road building in winter.....	251
maintenance.....	256
plans.....	29, 250
specifications.....	27
Gravel-stone road specifications.....	32
Gravity loading and screening device.....	253
Highway commissioners.....	313
letters.....	184, 188
suggestions by.....	275
Highway taxes 1908.....	319
-beams, table of sizes and weights.....	208
Illinois, convict labor.....	297
Improving township roads.....	189
labor, convict.....	297
Law, cash road tax.....	175
contracts.....	192
county road.....	132
county tax and bonding.....	171
drainage.....	228
intertown road and bridge.....	193
state reward.....	14
steam engines.....	232
township bonding.....	172
Legal opinions by attorney general.....	129, 192, 229, 230
Letter of transmittal.....	5
Letters, highway commissioners.....	184, 188
Letters to governor.....	5, 11
Loading and screening gravel.....	253
Macadam road, maintenance.....	255
plans.....	35
specifications.....	34
Machinery, road district.....	182
Maintenance, road and bridge.....	255
Material for roads.....	238
Members of department.....	3
Penitentiary roads.....	129
Files state reward road.....	58
Missouri convict labor.....	303
Motor vehicle fund.....	125, 152